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SECTION ON

Preventive and Industrial Medicine and Public Health

of the
American Medical Association
at the Seventy-Third Annual
Session, held at St. Louis, Mo.,
May 22 to 26, 1922

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LIST OF OFFICERS

Those named below have served as officers in this section. This branch of the practice of medicine has been included with other subjects in the earlier years, as will be seen by the headings which denote the different names given to the section. The names of the officers have been taken from the published records, which are deficient in some cases. It will be appreciated if any additional data are brought to the attention of the Secretary of the American Medical Association.

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PROCEEDINGS OF THE SECTION

WEDNESDAY, MAY 24—MORNING

The meeting was called to order at 9:20 by the chairman, Dr. S. W. Welch, Montgomery, Ala.

Dr. J. D. McLean, Philadelphia, presented the resolution referred to in the minutes of the Section on Practice of Medicine. The resolution was referred to the Executive Committee.

Dr. S. W. Welch, Montgomery, Ala., read the chairman's address, entitled "Training in Sociology and Public Health an Essential in Medical Education."

Dr. A. J. Warren, Topeka, Kan., read a paper on "The County as a Health Unit." Discussed by Drs. W. S. Rankin, Raleigh, N. C.; J. A. Hayne, Columbia, S. C., and W. L. Holt, Knoxville, Tenn.

Dr. John D. McLean, Philadelphia, read a paper on "Obligations of Preventive Medicine." Discussed by Drs. Allan J. McLaughlin, Washington, D. C.; Eugene L. Fisk, New York; H. B. Wood, Dodge City, Kan., and John D. McLean, Philadelphia.

Dr. W. A. Dearman, Long Beach, Miss., read a paper on "The Attitude of the General Practitioner Toward Established and Progressive Public Health Policies." Discussed by Drs. Oscar Dowling, New Orleans, and W. A. Dearman, Long Beach, Miss.

Dr. W. S. Rankin, Raleigh, N. C., read a paper on "The Mutual Interest of Profession and Public." Discussed by Drs. W. S. Leathers, University, Miss.; A. S. Hershfield, Chicago; A. T. McCormack, Louisville, Ky.; Rachelle S. Yarros, Chicago; D. B. McEachern, Chicago, and W. S. Rankin, Raleigh, N. C.

Dr. Otto Geier, Cincinnati, read a paper on "Some Reflections on the Recent Education of Health Officers' Conference." Discussed by Dr. M. P. Ravenel, Columbia, Mo.

Dr. Matthias Nicoll, Jr., Albany, N. Y., read a paper on "Politics and the Health Officer." Discussed by Drs. A. T. McCormack, Louisville, Ky.; Victor C. Vaughan, Washington, D. C.; J. A. Hayne, Columbia, S. C., and Matthias Nicoll, Jr., Albany, N. Y.

Dr. M. P. Ravenel, Columbia, Mo., introduced a resolution urging on Congress enactment of legislation to accept a gift made to the Surgeon-General's Library by the Prudential Insurance Company.

The resolution was referred to the Executive Committee.

(Not transmitted to the House of Delegates.)

Dr. C. E. Terry moved that this section request the Council on Health and Public Instruction to endeavor to have printed Dr. Rankin's paper on "The Mutual Interest of Profession and Public," at the earliest possible moment in THE JOURNAL, to reprint it promptly, and to see that a copy is sent to every county medical society in this country, and, if possible, to extend the circulation of the paper farther than that. Seconded and carried. Referred to the Executive Committee.

(Not transmitted to the House of Delegates.)

Dr. A. T. McCormack then moved that the Executive Committee be requested to draft a resolution to be presented to the House of Delegates, approving the suggestions made in Dr. Rankin's paper. Seconded and carried.

THURSDAY, MAY 25—MORNING

The meeting was called to order at 9:20 by the chairman.

The first order of business was a partial report of the Executive Committee.

The Executive Committee recommended the adoption of the resolution introduced by Dr. McLean. Seconded and carried.

It also recommended the adoption of the resolution introduced by Dr. Terry. Seconded and carried.

The Executive Committee reported that it was too late to introduce the resolution of Dr. Ravenel in the House of Delegates, but recommended that the sense of the resolution be approved by the section. On motion, seconded and carried, the recommendation was adopted.

It was moved and seconded that Arthur W. Hedrich, secretary of the American Public Health Association, be nominated Associate Fellow by the section. Carried.

Dr. John Dill Robertson, Chicago, read a paper on "Community Health Fundamentals." Discussed by Drs. Herman N. Bundesen, Chicago; Allen J. Hruby, Chicago; A. F. Campbell, Springfield, Ill.; M. P. Ravenel, Columbia, Mo.; Isaac D. Rawlings, Springfield, Ill.; A. C. Tenney, Chicago; J. D. Dowling, Birmingham, Ala., and John Dill Robertson, Chicago.

Dr. H. S. Cumming, Washington, D. C., read a paper on "Tuberculosis Among the Ex-Service Men, with Special Reference to Its Bearing on Public Health." Discussed by Drs. Henry Boswell, Sanatorium, Miss.; H. A. Pattison, New York; J. J. Singer, St. Louis, and H. S. Cumming, Washington, D. C.

Dr. William A. Evans, Chicago, read a paper on "Seasonal Distribution of Deaths and Some Conclusions Based Thereon."

Discussed by Frederick L. Hoffman, Newark, N. J., and Drs. S. J. Crumbine, Topeka, Kan., and William A. Evans, Chicago.

Dr. William H. Park, New York, read a paper on "Immunization Against Diphtheria and the Use of Toxin-Antitoxin." Discussed by Drs. Abraham Zingher, New York; John F. Hogan, Baltimore; William H. Thaler, St. Louis; C. A. Earle, Des Plaines, Ill.; W. S. Rankin, Raleigh, N. C., and Abraham Zingher, New York.

Dr. J. Howard Beard, Urbana, Ill., read a paper on "The Contribution of University Health Services to Public Health." Discussed by Drs. John Sundwall, Ann Arbor, Mich., and J. Howard Beard, Urbana, Ill.

Dr. Frederick R. Green, Chicago, read a paper on "Legal Status of Physicians and Sectarians." Discussed by Drs. W. C. Woodward, Boston; D. B. McEachern, Chicago; B. C. Darling, New York, and Frederick R. Green, Chicago.

Dr. M. M. Carrick, Dallas, Texas, introduced a resolution concerning care of ex-service men. Resolution referred to Executive Committee and transmitted to the House of Delegates.

FRIDAY, MAY 26—MORNING

The meeting was called to order at 9:05 by the chairman.

Dr. C. C. Bass, New Orleans, read a paper on "A Discussion of Malaria Control Operations in the Ultimate Suppression of the Disease." Discussed by Drs. L. D. Fricks, Memphis, Tenn.; M. P. Ravenel, Columbia, Mo.; Isaac D. Rawlings, Springfield, Ill.; S. W. Welch, Montgomery, Ala.; W. C. Woodward, Boston, and C. C. Bass, New Orleans.

Dr. Harry Garfield Irvine, Minneapolis, read a paper on "Some Notes on the Effectiveness of the Venereal Disease Program." Discussed by Drs. Valeria Parker, Washington, D. C.; William F. Whyte, Madison, Wis.; Carl Voeglin, Washington, D. C.; J. P. Bowdoin, Adairsville, Ga.; John F. Hogan, Baltimore, and Harry Garfield Irvine, Minneapolis.

Dr. Taliaferro Clark, Washington, D. C., read a paper on "Nutrition of the Schoolchild." Discussed by Drs. Borden S. Veeder, St. Louis; John Dill Robertson, Chicago; Allen J. Hruby, Chicago; W. L. Holt, Knoxville, Tenn.; Isaac D. Rawlings, Springfield, Ill.; Florence Meredith, Philadelphia; James Stewart, St. Louis, and Taliaferro Clark, Washington, D. C.

Dr. Anna E. Rude, Washington, D. C., read a paper on "The Sheppard-Towner Act in Relation to Public Health." Discussed by Drs. Marry Riggs Noble, Colorado Springs, Colo.; Taliaferro Clark, Washington, D. C.; W. C. Woodward, Boston; Carl Henry Davis, Milwaukee; S. W. Welch, Montgomery, Ala.; D. B. McEachern, Chicago; A. N. Creadick, New Haven, Conn., and Anna E. Rude, Washington, D. C.

Dr. Joseph N. Gehlen, Minneapolis, read a paper on "Detection of Typhoid Carriers, with Report of Four Outbreaks." Discussed by Drs. James J. Durrett, Memphis, Tenn., and Joseph N. Gehlen, Minneapolis.

Dr. B. Franklin Royer, Halifax, Nova Scotia, read a paper on "Health Centers of the Massachusetts-Halifax Health Commission." Discussed by Drs. Isaac D. Rawlings, Springfield, Ill., and Anna E. Rude, Washington, D. C.

The following officers were elected: chairman, John A. Ferrell, New York; vice chairman, John Sundwall, Ann Arbor, Mich.; secretary, W. S. Leathers, University, Miss. (term not expired); delegate, W. S. Leathers, University, Miss.; alternate, Paul A. Turner, Seattle.

TRAINING IN SOCIOLOGY AND PUBLIC HEALTH AN ESSENTIAL IN MEDICAL EDUCATION *

S. W. WELCH, M.D.
MONTGOMERY, ALA.

Near the home of my birth, where my youth and young manhood were spent, is one of the foothills of the Appalachian chain, which terminates in Alabama.

This mountain stands out boldly against the southern sky. I have spent hours in my childhood gazing upon it and wondering what was on the other side. In after years, when, to the music of a pack of foxhounds and the clatter of a good horse's hoofs, I reached its highest point, the thing that interested me most on the other side was not the beautiful plains, streams and wooded country, but still higher ranges of mountains in the distance, hiding other things.

I have recalled those dreams of my boyhood in my recent study of the work of the Council on Medical Education in its efforts since 1902 to elevate the standard of medical education in the United States. The history of this splendid work is as fascinating reading as a romance of the Elizabethan age. As in my boyhood experience, when high ground was reached, higher ground came into view, and point after point has been scaled until we stand today on a pinnacle of excellence unexcelled by any other country; but there is still higher ground beyond which we must reach.

There has been practically no advance in the teaching of preventive medicine in the last quarter of a century. Discoveries of methods of administration and methods of prevention have come forward by leaps and

* Chairman's Address.

bounds, but they have remained to be learned by the physician after he has taken up his life work, and not in that important period when he is preparing for it. For that reason, habits of medical thought have not been directed along the lines of preventive medicine, but have been confined almost exclusively to the curative side of the science. We shall not reach the highest ground ahead of us until we have introduced into our schools of medical education a course of study which will bring the medical student into easy touch with natural laws governing the transmission and prevention of diseases, the methods to be employed by the health administrators in their control, and the part to be played by the medical profession in the accomplishment of this great task.

It is important to recognize that modern attempts to solve, or, at least, to reach an approximate solution of fundamental problems, have led in our own day to the development of a number of comparatively new sciences associated with the basic human needs: food, shelter, defense and propagation. They are still rudimentary in a large degree and practically unstandardized. For this reason they are likely to be lumped together in our minds under the general title of "the social sciences," and to receive from us scant consideration or respect. Examined closely, are not every one of these embryonic sciences which deal with the major problems of human existence fundamentally a part of medical science?

Who can say that "a knowledge of the living human body and its many complex normal functions and structures" is more important to the prospective physician than a knowledge of the food substances necessary to keep the body going or to bring it to maturity and productiveness?

Who can say that "a training in dispensaries and hospitals where the student can observe patients suffering from all the more common diseases" is more

important to the future practitioner of the healing art than would be a training in courts and prison camps or in legislative halls, where he can study human nature in the raw, as it comes to grips with the problems of life?

If "he needs to be educated in regard to the many and varied forms of remedial agents and procedures which are of generally recognized value," is his need for an education in the many and varied forms of preventive work less imperative or less fundamental?

FIVE ESSENTIALS

If we grant, for the sake of the premise, that knowledge of remedial and preventive methods is of equal importance to the medical student, I am suggesting, for consideration, five essentials in the latter field which should be made a part of his medical education:

1. He needs to have a sympathetic understanding of the fundamental human problems in relation to the many complexities of modern life, and must become familiar with the trend of the best thinking along social lines.

2. He needs to know the place and function of sanitation in relation to the public welfare, the how and when and why of environmental influence on health. In other words, he needs to know when and how to make use of the knowledge of sanitary engineering, not necessarily to be himself a sanitary engineer.

3. He needs to be well grounded in the control of the communicable diseases and in bacteriology.

4. It is imperative that he should have a knowledge of hygiene, especially in its relation to the social and medical sciences which attempt to improve the race by approximating a solution of the basic problems of human existence; that is, the problems associated with the necessity for food, shelter, defense and propagation.

5. He needs to have a knowledge of psychology in its relation to conduct, with regard both to individuals

and to groups, in order that he may truly educate both individuals and groups in right habits of action, by supplying motives which appeal to them.

The Council on Medical Education and Hospitals is recommending to the American Medical Association at this session that the last two years of undergraduate medical study be devoted to the four majors: practice of medicine, surgery, obstetrics and public health. The colleges will be asked to pay less attention to courses in special branches during the undergraduate term, and devote more time to the education of medical practitioners.

I believe that more attention to the subjects outlined in the foregoing paragraphs will equip men to render a service to the individual and the community which will eventually bring the practice of medicine to a level of achievement undreamed of in the past. I believe that men who have received such preparation will be ready after their graduation to practice medicine in cooperation with the many and varied agencies for social betterment, with a greater degree of mutual understanding.

CONCLUSION

Let me emphasize the belief that the higher ground toward which we are rapidly moving will afford to administrators of public health a steadily enlarging field of usefulness because of the better understanding by the medical profession of the proper relation between the prevention and the cure of disease, and the appreciation by it of the opportunity to take its proper place of leadership in this great movement toward social tranquillity and the improvement of the race.

SOME COMPARATIVE RESULTS IN CITIES AND IN COUNTIES AS HEALTH UNITS

A. J. WARREN, M.D.
Director of County Health Work, Kansas State Board of Health
TOPEKA, KAN.

The incorporated city as a unit of civil organization for the protection of the public health has so thoroughly justified its existence, efforts and expenditures that the question of the propriety of such an organization is no longer debatable The evidence is all on the affirmative side.

Unfortunately, the county as a unit of organized civil efforts for the protection of the health of the people living in the rural communities and small towns is not so universally accepted. That the county as a unit has been neglected in the past is illustrated by the fact that the first position of full-time county health officer in this country was not established until 1911.[1] That the problem is still being treated with indifference is evidenced by the fact that of the 3,065 counties or equivalent divisions of the continental United States, only 161, or 5.2 per cent., were on Jan. 1, 1921, provided with a whole-time local health service. In other words, only 8.21 per cent. of the rural population of this country was on Jan. 1, 1921, provided with local health protection.[1]

"The country is the weakest link in the sanitary chain"[2] because the country has been neglected on account of the prevailing opinions that "rural health work, on account of distance to be covered and other obvious factors, is relatively more expensive"[3] and

1. Pub. Health Rep., Nov. 18, 1921, p. 2832-2836.
2. Rosenau: Preventive Medicine and Hygiene, p. 475.
3. Lumsden, L. L.: Pub. Health Rep. 36: 2472 (Oct. 7) 1921.

difficult than urban health work. Such opinions have apparently been accepted as sufficient justification for indifference in applying the remedy, without the necessary evidence to demonstrate either the truth or the fallacy of the accepted hypothesis. The result of this

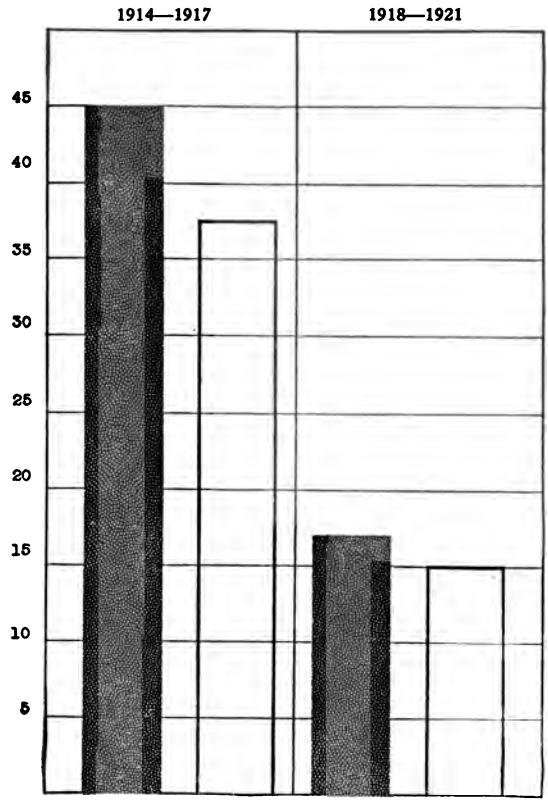

Chart 1.—Comparative typhoid death rates before and after the establishment of health departments: shaded area, cities; white area, counties.

accepted situation regarding cities and counties as health units has been a severe distortion of the once established facts. The urban death rates have declined as the result of the application by well organized municipal health departments of known sanitary and hygienic principles. The rural death rates have

remained undisturbed as a result of the lack of application of the same principles, until controversy is rife in regard to whether the city or the county has the highest death rate.

The fundamental principles involved in the prevention of typhoid fever are the same for the country as

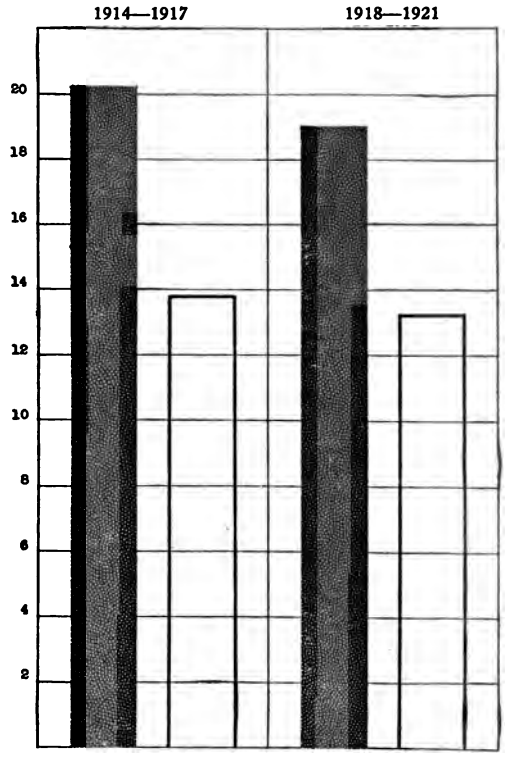

Chart 2.—Comparative gross death rates before and after establishment of health departments: shaded area, cities; white area, counties.

for the city, and they are the same the country over. The same is true of smallpox, diphtheria, infant mortality and other diseases concerning which we have fairly accurate knowledge. The only difference is in the practical application of the fundamentals involved to the given area. And even here differences are appar-

ent only in the execution of the details, and are not general. Natural factors also favor the country dweller, and the present conditions are a reproach to our lack of efforts and intelligence.

In order that some evidence might be made available to disturb the present equilibrium toward which we are approaching, an effort was made to determine the relative cost of, and effectiveness of, public health work in urban and in rural communities. A survey covering three cities and nine counties, all having well organized health departments, was undertaken.[4] The survey covered a period of eight years and involved a total average annual population of 461,244. Of this number, 108,534 lived in the three cities, and the remaining 352,710 lived in the nine counties. The cities ranged in population from 27,076 to 50,992 in 1921, with an average annual population for the four year period 1918 to 1921, inclusive, of 36,178. The counties ranged in population from 23,141 to 54,954, with an average annual population of 39,190 each for the four year period 1918 to 1921, inclusive. The cities and counties surveyed were all located in the central two thirds of the state of North Carolina, for the reason that in no other locality were the imperative factors of age of units and extensiveness of activities so favorable, and because of the fact that it was essential that the counties and cities involved should have some definite relations to one another. The counties and cities surveyed were all organized on a full-time basis on dates that were separated only by a few months. This wholesale organization took place between Jan. 1, 1917, and Jan. 1, 1918.[5]

The relative nearness of the dates of organization makes possible a division of the eight year period into two halves, one from Jan. 1, 1914, to Dec. 31, 1917, a four year period prior to the influences of organized health protection: the other from Jan. 1, 1918, to

4. Cities of Charlotte, Raleigh and Winston-Salem; Davidson, Edgecomb, Forsyth, Lenoir, Northampton, Pitt, Robeson, Rowan and Wilson counties (North Carolina).
5. Wilson County, Sept. 1, 1916; city of Raleigh, Oct. 10, 1918.

Dec. 31, 1921, a four year period during which the effects of organized public health efforts exert a positive influence on the respective communities. The nine county organizations were identical in personnel, plan of work and budget. The cities, while not so nearly identical as the counties, were similar in personnel, activities and budgets. In two instances the city health departments were organized and conducted for a short

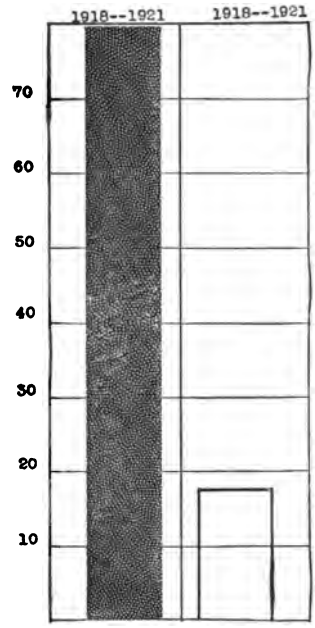

Chart 3.—Per capita expenditures in three cities and nine counties for health departments: shaded area, cities; white area, counties.

period by a personnel representing the United States Public Health Service. The three major problems of public health work—(1) the reduction of the filth-borne diseases of which typhoid fever may be regarded as the criterion, by means of sanitation, education and immunization; (2) the control of contagious and communicable diseases by quarantine, education and immunization, and (3) the reduction of infant mortality—were the activities that were first undertaken by

the city and county health departments. It is possible, therefore, to compare with some degree of satisfaction the results after four years of organized effort, as expressed in the specific mortality rates, the gross death rates and the per capita expenditures.

TYPHOID FEVER

While there is no one perfect index by which to gage the results of the effectiveness of public health work, the one specific disease that approximates most closely this condition is typhoid fever. "The cause, mode of transmission, and prevention are well understood in theory and readily attainable in practice. Sanitation here finds its first fruitful field; hygiene, its useful lessons, and immunology its special application." [6] The

TABLE 1.—TYPHOID DEATH RATES *

	Cities	Counties	State
1914-1917	44.9	37.3	31.38
1918-1921	17.0	14.9	15.83
Percentage of reduction	62.13	60.0	49.55

* The statistics were supplied by the Bureau of Vital Statistics, North Carolina State Board of Health.

degree of the effectiveness of the application of these principles will be very definitely expressed in the reduction of the specific mortality rate to a greater or lesser degree. And the application of these principles is the only known process that will abruptly alter the specific mortality rate in a community in which typhoid has been consistently prevalent over a period of years.

For the three cities, the typhoid death rate for the period 1918 to 1921, inclusive, shows a reduction of 62.13 per cent., as compared with the four year period 1914 to 1917, inclusive. For the same period of time the nine counties showed a reduction of 60 per cent. in the typhoid death rate.

The state as a whole (exclusive of the three cities and nine counties) for the same period of time showed

6. Rosenau: Preventive Medicine and Hygiene, p. 105.

a reduction of 49.55 per cent., which gives the cities a reduction in excess of the whole state of 20.24 per cent., and the counties a similar reduction of 17.41 per cent.

It is to be noted that while the cities show a slightly greater reduction in the typhoid death rate, the county rate is 11.7 per cent. lower than the city rate, and 3.8 per cent. lower than the rate for the state as a whole.

GROSS DEATH RATES

The composition of the population living in the rural area and the small towns, and in the cities as regards age, sex and nationality are of sufficient similarity to make a comparison of the gross death rates between the urban and country areas of considerable value.

TABLE 2.—GROSS DEATH RATES *

	Cities	Counties	State
1914-1917	20.3	13.8	13.10
1918-1921	19.0	13.3	13.33
Percentage of reduction or increase	— 6.4	— 3.6	+ 1.7

* The statistics were supplied by the Bureau of Vital Statistics, North Carolina State Board of Health.

For the three cities, the gross death rate for the four year period from 1918 to 1921, inclusive, decreased 6.4 per cent., as compared with the four year period 1914-1917, inclusive. For the same period the nine counties showed a reduction of 3.6 per cent. A very significant factor to be noted here is that while the cities show a much greater reduction in the gross death rates, the excessive gross death rates of the cities make the reduction relatively easier, and make a greater reduction possible in the cities. While the cities have shown a greater percentage of reduction of the gross death rates, the city death rates are still 30 per cent. in excess of the county death rates.

For the same period of time the gross death rate for the state as a whole (exclusive of nine counties and three cities) showed an increase of 1.7 per cent. All of this increase was for the year 1918, when the mor-

tality from influenza reached its crest in the state. This fact makes the reduction in the three cities and nine counties the more significant.

PER CAPITA COST

All money expended for public health purposes should have a twofold objective: (1) the reduction of morbidity and (2) the reduction of mortality. As yet we have no universally accepted standard for determining the reduction of the morbidity. Probably the mortality rate is as accurate an index of morbidity as any of the methods that have been advocated. At the present time the mortality rates must serve as the

TABLE 3.—POPULATION AND EXPENDITURES

	Annual Population	Annual Expenditures	Annual Per Capita Cost
Counties *	39,190	$ 6,835.60	$0.174
Cities †	36,178	28,911.92	0.799

* Data furnished by Bureau County Health Work, North Carolina State Board of Health.
† Data furnished by city health officers of Charlotte, Raleigh and Winston-Salem.

twofold index for estimating the degree to which the money that is expended has accomplished its original objectives.

In reducing the mortality rates 6.4 per cent., the three cities expended the sum of 79.9 cents per capita. The nine counties spent 17.4 cents per capita in effecting a reduction of 3.6 per cent. in the gross death rates.

CONCLUSIONS

The conditions in North Carolina are not representative of the conditions in Kansas or in Maine. The cities and counties of North Carolina do, however, have a definite relation to one another. The cities and counties of any other state have a similar relation.

The parallel that has been drawn is not exact. No similar comparison can be exact.

The evidence submitted proves, conclusively, nothing. It does, however, suggest that the charge that rural

health work is more expensive and difficult than urban health work needs modification, if not a complete withdrawal.

ABSTRACT OF DISCUSSION

Dr. W. S. Rankin, Raleigh, N. C.: As to the importance of developing full-time county health departments, and the comparative ease with which such work is done, I think that all state health officers who have concerned themselves with this problem have been encouraged with their success in inducing the counties to see the importance of making arrangements for taking care of the health and lives of their people. The full-time county health officer problem is, in a sense, a psycho-epidemic affair. Get a few counties started and produce results. Establish a fairly practical satisfactory plan to work and it is easy to carry the idea into the adjoining counties. When one considers the opportunity in this particular field as compared to the opportunity of developing urban health work, and when one thinks of the 3,065 counties in the United States with only 6.5 per cent. having full-time health departments, one can see what a vast field of opportunity exists. In the South it has been much easier in recent years to develop rural than urban health work. The main restriction in rural health work is not the willingness of the people to put in a health department but the difficulty of obtaining health officers who can put through the idea that the people have endorsed. In going into a county, the usual procedure is to see first an influential group of men. In my opinion the influential group which should be consulted first is the professional group. We have neglected too much the matter of conferring with the local profession. It does not make any difference what we are going to have done in that county, it has to be done through the local profession. The recognition and prevention of disease and clinical diagnosis are things for which one has to depend on the local profession. The doctors ought to be seen first if for no other reason than as a matter of proper respect. The profession, because it has not been consulted as it should have been, has not understood what was going on, and the lack of cordial relations has resulted in a certain indifference. Ordinarily it is easy to get the approval of the county medical society to put in a county health department if one presents a reasonable proposition. When health officers fail to get the approval of the county medical society for a full-time health department, it means that either the profession of that county is unreasonable or that the man who is selling the proposition is not a good salesman. I want to add my full endorsement to the conclusions drawn by Dr. Warren.

Dr. J. A. Hayne, Columbia, S. C.: I have neither respect for nor confidence in any statistics, but Dr. Warren's statistics are extremely interesting. He showed that with a per capita tax of 15 cents a considerable reduction could be made in the death rate of the rural population. Coming from a state that has 85 per cent. rural population, this is a matter of some interest. The full-time health officer was stressed for a long time. I never believed much in whole-time county health officers. I do believe in whole-time county health departments. County health officers cannot do well without sufficient support. They must have the same support as a city department of health. Some years ago we had the idea that in a county thirty miles long and twenty miles wide one county health officer could accomplish results by simply being there. We found that this did not do any good except to provide a rather comfortable place for the man who had the position. At present we believe in having county health departments with trained county health officers at the head, a nurse or two, sanitary inspectors and a clerk-stenographer, and, if necessary, a sanitary engineer and all the necessary equipment for doing proper health work. Most counties have more than 30,000 population. Would a city of 30,000 population think it was doing justice to the people if it did not have a health officer? Why does a county of 30,000 population think it is doing its duty to the citizens by having health officers who occasionally appear during epidemics and usually make themselves very disagreeable to the physicians? In South Carolina the medical profession of the state is the department of health of the state. That is the proper way. That is the board of health that is going to succeed. When you leave out the physicians and try to put in health officers you are going to fail.

Dr. W. L. Holt, Knoxville, Tenn.: I had some experience in county health work in Los Angeles County, California. All the rural health work in the county of 4,000 square miles was managed from the central office in Los Angeles. We had two or three deputy health officers and about six nurses and two inspectors, and did a great deal of work. The splendid roads everywhere enabled us to travel fast by automobile, and I often traveled a hundred miles a day in visiting only a half dozen cases. The cost of administration for each case is much greater than it would be with about six cooperative health departments, each covering both the urban and rural territory in its district. Of the total population of about a million in the county, about 800,000 were inside the thirty-three cities and towns in the area and cared for by municipal health departments. The remaining 150,000 were scattered all over the great county and were cared for by the county health department in an efficient but uneconomical way.

ATTITUDE OF THE GENERAL PRACTITIONER TOWARD ESTABLISHED AND PROGRESSIVE PUBLIC HEALTH POLICIES

W. A. DEARMAN, M.D.
LONG BEACH, MISS.

Public health is as old as human society, and dates its history from the first endeavors of tribes and communities to preserve their health, limb, and well being. The wisdom of generations through education, research and discoveries has made phenomenal progress in the prevention, control and cure of communicable diseases; and the expanding and broadening influences of public health organization and administration have approached and invaded the field and domain of every phase of human activity. In the wake of this marvelous progress, we stand on the threshold of the twentieth century, observing the lengthening of the span of human life, a decreased morbidity from many preventable diseases, and a marked decrease in mortality rate.

Health—the vital principle upon which all progressiveness, prosperity, happiness, and well being depend, and the valuable asset to which all industrial, commercial, professional, and agricultural interests grant recognition—is the hub around which the great wheel of human progress is made to revolve in one great coordinated and harmonious function; health and progress are mutually dependent for success and perpetuation.

Through the widening influence of established and progressive constructive public health policies, the general practitioner has sustained an attitude of responsiveness, willingness, fearlessness and wholehearted-

ness. In discharging the duties outlined and prescribed by public health administration in the prevention, control, and cure of formidable diseases, occurring either in sporadic or endemic form, or assuming epidemic or pandemic proportion, the physician has always stood in the forefront.

In recent years wonderful strides have been made in legislative and administrative public health organization in order to meet the demands and requirements of a growing and expanding civilization; and it has been impossible for the medical profession, owing to a limited opportunity, to keep pace with the newer problems and developments, the specific obligations and duties that have come to play a great part in a successfully coordinated and cooperative public health function in the prevention and suppression of disease; a knowledge of which is essential in scientifically combating the various conditions which are a menace to our civilization, and which come under the authority and administrative policies of public health organization and activities.

The present day attitude of the general practitioner toward established and progressive health policies is being looked on with some apprehension. The rural and village physician has failed to meet the increasing demands of public health. This is due, largely, to the deterioration of the so-called family physician, whose conception of the legitimate practice of medicine does not embrace, as a whole, that most sacred function of relieving pain or ministering to the sick at the expense and neglect of his own household; and whose mind reverts to that Biblical injunction: "But if any provide not for his own, and specially for those of his own house, he hath denied the faith, and is worse than an infidel." The various conditions under which the average rural physician must labor are not the most desirable. The conveniences of well ordered hospitals, equipped for the diagnosis of disease and the subse-

quent care of his patients, are inadequate or wanting. The average physician must depend on mere clinical evidence of a subjective and objective character, and this is often vague and misleading. William J. Mayo[1] says: "America is today successfully functioning on the average intelligence, which is steadily growing as the result of publicity, a form of education to which the American is most responsive." It has been asserted by physicians of good authority and of wide experience that the average practitioner who has not acquired a knowledge of the wonderful advances in modern diagnostic medicine in recent years aggregates approximately 60 per cent. of mistakes in all his diagnoses. This percentage does not include the application of unscientific and slipshod therapeutic measures. The foregoing, in my opinion, is responsible for the professional unrest which is punctuating our commonwealth, not in all, but in many sections of the country. When the general practitioner awakes to the realization that time and tide wait for no man, he will assume a different attitude toward the policies of public health organization, and will subscribe with all the vigor of his soul to the duties that devolve upon him.

The specific obligations to established and progressive public health policies and the attitude which the general practitioner should sustain to them are too numerous, and time is too short, for their general discussion. However, attention should be called to the following diseases and public health measures:

Diphtheria, a universal disease with a mortality of approximately 12 per cent., which comes under the observation of every physician alike and which is classified as a preventable disease, deserves the closest attention of every practitioner from a diagnostic point of view. The early recognition and prompt cultural and bacteriologic investigation, notification and isola-

1. Mayo, W. J.: The Medical Profession and the Public, J. A. M. A. **76**: 925 (April 2) 1921.

tion, and the early and sufficient dosage of antidiphtheric serum; the prompt and efficient application of the Schick test in all immediate contacts, observations of this test and the correct interpretation of reactions, the immunization of all positives; and, as is required in many states, two negative cultures from the nose and throat on alternate days should be diligently prosecuted by the general practitioner. The last mentioned factors are too often neglected by the physician and quarantine restrictions removed and the patient discharged after clinical recovery. If the foregoing measures are honestly and scientifically carried out, the greater part of the attending physician's time will be absorbed, and the details of dealing with remote contacts will be reserved for the functioning of public health organization. As an example, the clinically ill child has come from a school with a large attendance; it does not come within the province of the private practitioner to invade with no authority this field to conserve the interests of the student body and to have jurisdiction over the reflexes of the patient under his private observation, as found in the school. Other outside exposures over which he has no control or authority must be dealt with in a like manner, and the public health service comes to the rescue, even to furnishing antitoxin free or at a greatly reduced cost to indigent patients.

Sporadic typhoid and paratyphoid are diseases that arise in every section of the United States and come up for diagnostic study in every day routine of practice. The early recognition of suspicious subjective and objective signs, blood culture, and later a Widal, as a confirmatory procedure, should engage the attention of the general practitioner. Notification, isolation, the establishing of the precautionary measures necessary for the family interests, and the early immunization of all contacts in the household, with the treatment of the patient, consume the greater part of the

physician's time and energy. The source from which the infection originated must be traced if possible, and the danger which threatens the public should come under the authority of public health administration for its final solution and disposal. The health authorities will and can take immediate action in a thorough investigation of the milk, water and food supply, and render a service to a physician's community or city that is a blessing to humanity and will save the lives of many unfortunate people who are ignorant with reference to the prevention of typhoid when occurring in sporadic form and gradually fastening itself upon the people in epidemic proportions, leaving in its wake frightful morbidity, death, invalidism, and the complete disorganization of community interests.

Smallpox, scarlatina, measles, mumps, meningitis, tuberculosis and many other diseases warrant a close investigation and early active measures, prophylactic and otherwise, on the part of the general practitioner.

The venereal problem in recent years has attracted world-wide attention from the physician and the laity alike, and the general practitioner might assume that public health interests have invaded his private practice in the establishment of free treatment clinics; however, a casual glance over the country will convince any fair-minded physician or layman that at least 90 per cent. of venereal diseases are improperly diagnosed and inadequately treated. The primary sore in the majority of instances has not been given the proper study and consideration, but, on the other hand, cauterization is the rule, and the successful investigation of the lesion is grossly embarrassed and rendered impossible to the bacteriologist whose duty it is if possible to demonstrate the presence of spirochetes. The majority of patients having primary sores are dismissed with a feeling of optimism. The patient with syphilitic urethritis is usually given a bottle of medicine and a popgun syringe, and further treatment and care

left to his own volition. The results of this gross and wanton neglect and indifference have led public health officials to the full realization of the great dangers which the individual as well as the public at large are to suffer from the progressive onslaught of venereal diseases which are of such formidable character. No municipal, county, parish, state, national or international public health service has ever invaded the field of a private practitioner whenever adequate provisions have been made and scientifically applied in the diagnosis, treatment and observation of venereal patients.

It is from the competitive fields of private practitioners that the majority of infectious and communicable diseases develop and offer foci for rapid extension; and if the general practitioner fails to meet the obligations incumbent on him in early diagnosis, investigation and treatment, as well as imposing certain definite and specific public health restrictions, either through ignorance, indifference, laziness, carelessness or self interest, he has lost sight of, and has a gross misconception of, the primary and fundamental functions of public health interests. It is frequently embarrassing for the physician to advise and establish quarantine and restrictive regulations, and it is a most prolific source of disorganizing the traditional standing of the physician with the patient and family. It is to this last mentioned feature of a physician's activity that I would point out the necessity of observing that keen sense of responsibility which he owes to a well organized public health function, for the mutual welfare of the physician, patient, family, relatives and the public at large. It is a specific obligation of physicians as a unit of influence to make straight the paths of public health activities. The realization on the part of the profession that no epidemic of formidable disease ever enhanced the monetary interests of the physician, but, on the other hand, taxes his resources to the maximum in caring for the indigent

on whom most epidemics seem to fall, is an outstanding feature in the experiences of every practitioner.

Cooperation of the general practitioner with public health policies cannot be too strongly commended; and, aside from the attention of the profession given to the early diagnosis of the various infectious diseases and the proper tentative or specific quarantine and precautionary measures against them, there are many important issues to engage his attention. The prompt and scientific report of all cases coming under morbidity reports should be carefully and accurately stated and returns made. The proper assignment of death on all death certificates should receive equal attention and consideration in order that they may be properly classified. The director of the bureau of vital statistics of my state informs me that approximately 600 letters are written monthly, endeavoring to obtain correct information and the proper assignment of death on erroneous death certificates. This is necessary before tabulation and classification can be made. The classification of diagnosis and the international list of causes of death should be correlated, to simplify and to avoid confusion in the mind of the profession.

A knowledge and a definite understanding of all vital and specific public health regulations by the profession and a closer study of the many problems with which the general practitioner has to deal, reflexly affecting public health policies, will eventually lead up to that great ideal of cooperative action, and the attitude of the profession toward established and progressive health policies will stand out as a most brilliant achievement in modern day preventive medicine and public health.

ABSTRACT OF DISCUSSION

Dr. Oscar Dowling, New Orleans: The earliest record of a legally constituted health board is that of Massachusetts, which was established in 1869. Health work has progressed haltingly since then, and other boards or commissions have

been organized as conditions or politics seemed to demand them. The first state board of health in Louisiana was organized in 1898 and was the legal successor of the joint state and city board of health, created in 1855 just after the appalling yellow fever epidemics of 1853 and 1854. The growth since then has been slow but definite. In the past, yellow fever was the real inciting cause to growth. The danger to the state from this disease was too great to be lightly passed over. The people and the profession demanded protection. Now yellow fever is a thing of the past, and plague, a more recent development, causes no more excitement than diphtheria or smallpox. The history of public health development has been about the same as in other states; it came only after popular opinion had made itself felt, generally following some calamity. It goes without saying that the medical profession in general cooperates with the health authorities. Vital statistics are an index to the health conditions of the state. Physicians give their support almost without exception to any measures that are planned for health improvement. They stand alone as the only professional men who are consistently undermining their source of revenue. The physician's specific obligations, as I see them, consist in improving our vital statistics returns; in applying the principle of preventive medicine in his own immediate neighborhood, and in giving his active assistance and moral support in enforcement of the sanitary code and the quarantine laws. As an individual unit, the average physician knows and does his duty, and fulfils his moral obligations to the letter. He is the central influence around which laymen collect for advice and help when something happens. I have already referred to the cooperation of the medical profession and public health interests in the abstract. How far shall we expect this cooperation in dealing with mass medicine, free clinics, free diagnosis and free treatment on a large scale? The physician usually adapts himself to the new conditions because he feels that the men behind them are imbued with the same spirit that he is. They are primarily interested to suppress and eradicate disease and make life endurable for those unfortunates whom he may not reach or who seldom get the benefit of his knowledge. Public health interests and medical practice have the same goal, the relief of human suffering and the prolongation of life.

THE MUTUAL INTEREST OF THE PROFESSION AND THE PUBLIC

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The profession and the public have a large mutual interest which unites them in a common task and draws them toward a single objective. That interest consists of a surplusage of unnecessary, untreated and inadequately treated disease and impairment, which, in its totality, constitutes a waiting field of medical practice from two to five times greater than the present occupied field of medicine. The last statement constitutes the major premise of this paper, and is so related to what follows as to make its assimilation by the digestive or analytic process advisable before other related matters are considered. We turn, then, to a brief and rather general analysis of the unoccupied field of medicine.

Beginning with maternity, we find from 25 to 35 per cent., say an average of 30 per cent., of the births of this country, a total of approximately 750,000 births a year, unattended by physicians. These women pass through the valley of the shadow of death with no ray of the light of science to dispel its gloom, and with only the flickering candle of the midwife to guide them through their travail. Add to the labors without medical attendance the enormous unsupplied need for medical supervision during pregnancy; add again need of the puerperal state for medical care so inadequately supplied, and you have an uncared for field of maternity from two to five times the size of that which is cared for.

From infancy, we pass to childhood. Add absent, delayed and inadequate medical attention to the cases of acute diseases of early life—measles, whooping cough, scarlet fever, diphtheria, meningitis, early manifestations of tuberculosis, etc.—and add to that the needed treatment for the common defects of childhood (how significant the term), the 20 per cent. or 4,000,000 public school children of the country with defective vision; the 75 or 80 per cent. or 15,00,000 public school children whose mouths need treatment, in order to prevent subsequent digestive disturbances, rheumatism and cardiovascular damage, and the 5 per cent. or 1,000,000 public school children who need operations for tonsils or adenoids; and again consider the relative sizes of the occupied or unoccupied fields of medicine.

From childhood, we hasten on to adolescence, the age of sex awakening and social restraint of the sex impulse, the premarital state. Here we find susceptibility to, prevalence of and damage from venereal diseases greatest. With syphilis causing one tenth of all deaths, producing 20 per cent. of the inmates of our institutions for the insane (whose total population approximates the population of our universities), with gonorrhea as the chief cause of sterility and the principal contributor to the gynecologic wards of the hospitals, with its enormous drag on efficiency and industry —in combination, a group of diseases which in the height of the war took more men out of the line of battle than shot and shell and gas—and you have a field of medicine that largely sustains three specialties, gynecology, genito-urinary surgery and skin diseases, and, in addition, generously contributes to the general run of the practice of medicine. How much of this enormous field is occupied? From 16 to 20 per cent. of the venereal diseases are reported by physicians,and perhaps not more than twice that percentage, 30 or 40 per cent., are treated by the profession. Of the cases that are seen by physicians and treated by them, it is

safe to say that even those cases do not receive or take one third of the treatment that is needed in the interest of both the individual and the public. No one well informed as to the prevalence of this group of diseases can seriously consider the treatment given as compared with the amount of treatment needed without again agreeing that the unoccupied field in this sector is from two to five times greater than that which is adequately held by the forces of science.

Again, we hasten on. We have arrived at adult life. In the interest of time, we introduce but one witness, but that an altogether sufficient one for the question involved. The Life Extension Institute of New York, in the last two years, has examined about 250,000 people, of both sexes, all races, engaged in various industries and living in different parts of the country, the persons examined being selected indiscriminately with reference to appearance. The institute found that about 60 per cent. of those examined were in need, at the time of examination, of medical treatment, and not more than 20 per cent. of those needing treatment were receiving it. In short, it was found that, in adult pathology, the field was about one fifth occupied and four fifths unoccupied.

Truly, the fields are white unto the harvest, but the laborers are few. This great surplusage of disease makes the interest of the profession and the public one, binding citizen and phsyician in a common purpose, coupling the determination of the public to remove disease surplusage with the ability of the profession to bring about the removal. Let those shallow minds and timid souls among the brethren who fear or feign to fear a curtailment of professional opportunities and rewards, both material and immaterial, remember that only through the use of medical science, only by making the field of medicine larger and more attractive, can this waiting, unoccupied field of medicine be reclaimed from the domain of ignorance and need.

DEVELOPMENT OF THE MUTUAL INTEREST

Medical science cannot hold the nose of the public and pour remedies down its throat; it is not a child incapable of thinking, insusceptible to advice and reason. The need of remedies and the value of remedies must be explained to the patient, and a desire to be treated created in the patient's mind. In short, a greater demand for the application of medical science to the existing surplusage of disease must be developed.

INCREASING THE DEMAND

In increasing the demand for medical science, in intelligently enlarging the usefulness of medicine, we have an educational problem confronting us. Intelligence appreciates, uses and pays for medical science; but ignorance neither appreciates, uses nor pays.

There are two principal ways of developing this educational work. One way is by the written word, bulletins, pamphlets, press articles and literature in various forms. The other way is by the living voice addressed to individuals collectively. The first is the method of the Bible; the second, that of the preacher. The first way is the usual method pursued, and, in general terms, about the only method available for such central agencies as federal, state and associational health services; furthermore, for most local health agencies, in which personnel in proportion to the population to be reached is limited, education by the written word is the method that has to be depended on very largely. The second way, the living word, is a method that exists potentially rather than actually. It is needed for close-up work; it has the element of personal contact which carries, in addition to the letter, the spirit that gives it life; it is the only way that a large, unreading, potentially influential voting population gets its information and its inspiration. The first way, by the written word, scattered broadcast through printed page from some long distance agency, is helpful

and is necessary as is the barrage in preparation for a hand to hand fight; but the second way, by the meeting of the masses in person, talking to them collectively, answering their individual questions before collective groups, dealing with them as man to man, is as necessary to carry the strongholds of superstition and prejudice for the forces of science and progress as is the infantry attack in battle.

It is not necessary to discuss here public health education through the written word. We are all familiar with that. I do, however, want you to consider carefully the need and the potentialities of educational work through the living voice, directed toward raising the popular intelligence with respect to the prevalence of disease and impairments and the more extensive use of medical science. Consider, if you will, the weak position of our church or denominational organizations if these organizations depended on their state publications, their correspondence and their traveling evangelists, having no local and fixed group to do the collective educational work through the living voice, following this with pastoral or case work which the preaching makes possible and extends. Our local physicians, members of county medical societies, make their pastoral calls to heal the body sick physically as the minister makes his local call to heal the body sick spiritually; but they do not complete the local minister's program; they do not speak to their congregations, they do not preach the gospel of good health; of right living here; they do not teach the people collectively.

The county and local medical societies, particularly the rural medical societies, must become better organized for other purposes than merely to meet once a month, discuss differences of opinion with respect to scientific problems and occasionally construe the code of ethics. They must become organized to meet their social, collective, larger and common opportunities and obligations to what Dr. Osler used to refer to as the larger audience.

Our units of medical organization are so constituted today as to inhibit rather than encourage the education of the local people collectively by the living voice of their own physicians. Let some member of the average county medical society begin to make public addresses in his county on subjects in which he is especially interested and which are of far-reaching importance to the general welfare: no matter how worthy his purpose and how well performed his task, he unavoidably takes an advantage of his fellow practitioners, in that he, in educating his own people collectively, inevitably advances himself personally; he is looked on askance by his fellows, is called an advertiser, is discouraged, and suspends operations. Only the outsider from some distant point can speak to the people of the county without the risk of suspicion.

Suppose, on the other hand, that the average rural county medical society, say with twenty-five members, selects twenty-five subjects which will include 90 or 95 per cent. of the information on hygiene and health that the county people need, and secures the promise from each of its members to speak or read once each month an address or paper which the county society writes, or secures from some outside source and finally adopts as its own address. Note that the address or paper is now not that of the person who presents it, but is that of his profession. Such a program would mean a total of 300 public addresses during the year, which, given to average audiences of only 100 people, would reach a total audience during the year of 30,000; that is, practically the entire population of the county. Under such an arrangement, collective medicine would make contact with collective thought; and no outsider, federal official, state official or any one else could come between the local group of physicians and their own people. It is high time that the organic units of the medical profession begin to assume their rightful leadership in public thought, the local professions no longer

being content with pastoral visits and with no well considered plan of collective work for the physical salvation not only of their people but of themselves as well.

SUPPLYING THE INCREASED DEMAND

As organization of the local unit of the profession, that is, the county medical society, is necessary to increase the demand for medical science and enlarge the field of medicine, so, too, the organization of the county medical society for the purpose of supplying the increased demand will be necessary. I shall touch only briefly on this phase of the subject.

The primary demand will be for examinations and diagnosis. The educational work above outlined will cause hundreds and thousands of those who become interested in the matter of health to wish to know whether they have an incipient or unrecognized disease or impairment, or whether, by alterations in living habits, their health may be promoted to a higher level. A secondary demand that will arise in consequence of such physical examination will be a more extensive demand for treatment.

In providing for these two demands, more adequate diagnosis and more adequate treatment through organized effort, it will be found that the plan of organization will involve both the local profession and the public, and will embrace both professional and business considerations—the former relating to the profession, the latter to the public. The two organizations, profession and public, and the two main considerations, professional and business, will merge and find their proper relations in a public county clinic, run and manned by the profession, and financed by the community.

In considering the professional organization of such a clinic in an average county of twenty-five practicing physicians, a service of four hours a week from each physician would provide 100 hours of professional service every week for the county. Such a public clinic could operate two afternoons, for four hours each,

every week, with twelve physicians in attendance; or four afternoons, for two hours each, with ten physicians in attendance; or four afternoons, for three hours each, with eight physicians in attendance. However, the number of hours served by the combined county medical society, and their arrangement of one day, or one afternoon, or several afternoons, and in groups of four, six, eight or ten physicians, are details for the consideration of the local county society. With 100 hours a week, and with physicians working in groups as they did in examining the drafted men during the war, from 100 to 150 people a week, from 400 to 600 a month, from 5,000 to 7,000 a year could be examined.

As a result of these examinations, a greatly increased demand for medical treatment will inevitably arise. Those needing and seeking treatment may be classified into those who can pay and those who cannot pay. The first class would be referred by the clinic to their family physician. In considering the second class, those who cannot pay, the charity practice of the county, we come to the business considerations involved in this organized effort to meet the increased demand for medical science.

In dealing with the business elements which enter into this problem, it will be well to observe, at the outset, that the burden of charity practice, constituting from 20 to 40 per cent. of practice, should not rest on twenty-five citizens of the county; that is, on the twenty-five practicing physicians; but it is a burden which should be distributed and which should rest on the entire citizenship of the county, its 30,000 people. All treatment administered in the clinic to the needy should be paid for by the public, and the funds paid in divided among the physicians serving the clinic, according to details to be worked out jointly by the county medical society and the group representing the public.

In securing funds for such a clinic, the following possible sources are to be considered: (1) a nominal

charge against all who apply for clinic benefits; (2) local Red Cross chapter funds; (3) local funds received through the sale of Christmas seals; (4) appropriations by the city or town authorities; (5) appropriations by the county authorities; (6) an annual church collection from the churches of the county in response to the commission "heal the sick," and (7) contributions from benevolent and financially able citizens of the county. With the educational work on which all this is predicated, the necessary revenue to maintain a public clinic would be assured.

A business organization of interested, broad-visioned, public-spirited men and women should be effected, in order to organize the people of the county around the clinic. Such a lay organization would assume two definite tasks: (1) arranging for the places and notices for public addresses by the physicians, and (2) securing funds with which to finance the clinic.

The local medical society would work out with this group of business men, and define on paper, the conditions under which the business group, representing the community, would issue cards of admission and requisitions for treatment to those who applied. In the whole scheme, the local society, through organized effort, would assume the initiative, and approve everything that was done in providing for both the increased demand with respect to diagnosis and the increased demand for treatment.

The profession at present is extensively and intensively interested in the development of public hospital facilities. This is a worthy interest, and should be encouraged in every way. But the hospital is something that will come only when the local county people have been informed through educational methods as to the prevalence and meaning of disease and impairment; and when they have demonstrated, through a public clinic, what can be done through organized effort in the treatment of disease and impairment. In short,

public organization to care for disease and impairment in an adequate way will follow and never precede professional organization. We shall have organization and cooperation without when we get organization and cooperation within.

ABSTRACT OF DISCUSSION

Dr. W. S. Leathers, University, Miss.: I have had the opportunity during the last several years of making observations along the line that Dr. Rankin has discussed, and I believe that he touches a most important phase of preventive medicine when he emphasizes the unoccupied field of medical practice. There can be no question about the fact that the surplusage in the treatment of disease is one of the outstanding phases of public health work in the prolongation of human life. Reference is made to maternity and infant welfare work and the relation of the midwife to infant mortality. In my own state, a careful survey has been made during the last year as to the number of midwives, and it appears that there are more than 4,000 in Mississippi, more than 95 per cent. of whom are negroes. It is doubtless true that about 40 per cent. of all births are attended by midwives who are incompetent and uninformed. It is clear, therefore, that this is a matter that should give us much concern in the conservation of the health of mothers and in the prevention of infant mortality. In view of the fact that the physicians in many of the states are not well distributed in relation to the population, there is at this time a considerable restlessness on the part of the general public relative to the care given them from the standpoint of the medical profession. The country people are not getting the attention which they think they deserve in the treatment of disease, and therefore there is a grave responsibility on the medical profession in the working out of a better adjustment or plan in giving medical attention and care to people in rural districts. It seems to me that the time is rapidly coming when there should be in every county, or group of counties, a hospital which shall be available for the people requiring medical attention, and which will afford them the very best medical aid. It is quite discouraging to the family living in the country, say 10 or 15 miles, who needs medical attention and has to pay the physician $3 for the first mile and $1 for each mile thereafter. This situation almost makes it prohibitive for the average family to secure the necessary medical attention. Dr. Rankin makes it very clear that education is fundamental in the prevention of disease and in the prolongation of life. If the general public were educated properly, the 50 or 60 per cent. who have no appreciation of scientific medicine would seek the advice of a

competent physician. It is very desirable, therefore, that public health activities should be so directed that the people are educated not only in the science of preventive medicine, but also relative to the importance of seeking medical advice promptly when ill. The prevention and cure of disease are in a way inseparably associated for the reason that in many diseases an early diagnosis means prevention as well as cure.

Dr. A. S. Hershfield, Chicago: We are hard put as physicians to live down the errors of omission and commission of our forefathers. There was always something mysterious about medicine, and even a patient who received a prescription written in Latin regarded it as something mysterious without ever taking the medicine. There was something mysterious about the doctor; in other words, he appealed more to the mysticism of the public than to their intelligence. He is trying to live it down now. But, in this living down and treating the public as intelligent beings, we find the Christian scientists and other sects coming in with the mysteries that we are beginning to abandon, and that is why they are enjoying the vogue they are today, because we are appealing to the intelligence and they are appealing to the mysterious. That is something we have to preach. Dr. Rankin enumerated a number of contributions to public health work, but I did not hear how he was going about preaching the danger of medical politics. That is the essential factor. The chiropractors and the other cults are thriving because they get in under the law. The doctors sit back and let these people appeal to the mysterious that we are trying to live down. We have nothing to back us politically. Why can we not be politicians? If we are right in the work we are doing for public health, why can we not have men to represent us in the legislature and not politicians who laugh at us because we have no political standing and no physician wants to get up and fight for his right, because politics is below his dignity? He is sat on, he is taken advantage of, and the things we are trying to abandon are forced on us.

Dr. A. N. McCormack, Louisville, Ky.: Having for several days listened to the vapid utterances of some of the superficial and ignorant members of our own profession who had no more conception of its possibilities than they had of the simplicity of the wonderful method of salvation, it is refreshing to listen to the words of a wise man who would lead us out of the wilderness in which some of our noisy but utterly mistaken leaders are trying to bury us. There is no trouble about physicians practicing medicine in the country districts, or about physicians in our cities who are carrying on the work; the trouble is from the various commercial organizations forming in the profession. We are told that America needs more organizations for physicians and that the physicians of America are interested in nothing but their own

livelihood. The time is coming when those who work must rise and talk and must furnish our profession with leadership if we are going to get anywhere. We have stayed too long silent, or these things could not happen. Dr. Rankin's paper will be mimeographed and sent to every physician in Kentucky, so that it will be read in every county society. Down in Panama I saw this plan in operation, and I realized that there the public is so well educated that it demands real medical service, and it takes five times as many physicians as we have in the most thickly populated section of the United States to give that service, and it is to supply that demand that we must look forward to the real future in medicine; yet we hear our little folks get up and say, "There are enough doctors." There is not enough foresight in this country yet to realize the number of physicians needed when Americans are made the healthy persons they ought to be with the knowledge we have as to how to keep people well.

Dr. Rachelle Yarros, Chicago: I want to endorse practically everything that Dr. McCormack has said. We cannot have too many endorsements of such good sense, courage and progressivism. There are many in the profession who share his views, but refrain from expressing them. If such a paper will be read not only by the physicians of Kentucky, but by all physicians in the United States, many of the doubts and fears now entertained will disappear, creating a greater tolerance on the part of the profession toward some of the newer problems of public health. Many of the difficulties that we encounter in this connection are no doubt due to the fact that most members of the profession have far too little time to follow the new developments in medical work of today and the modern demands that society is making on us. We must learn this lesson as quickly as possible: that health education of the lay public is always helpful to the profession. It always creates greater demands for the services of physicians as well as gives greater opportunity for work in new fields. This can be illustrated most clearly by citing the instance of the education of the public in venereal disease control work. The same no doubt can be said about tuberculosis and other public health measures, such as the "bill for better maternity care," as Dr. Rankin stated so well. My experience is that the public is now more ready than ever to receive and benefit by health education, and naturally looks to the profession to take the leadership in supplying such education. Unfortunately, too many physicians have adopted a short-sighted attitude and have either stood aside or actually fought every progressive tendency in public health, making every effort to minimize the value of education of the lay public in health matters. It is a pity that physicians in fighting the newer measures of public health have produced the impression among enlightened laymen and social workers

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that they are actuated solely by selfish considerations. As a profession, we must begin to abandon our extreme individualistic attitude and train ourselves to cooperate more readily with social agencies working toward the physical and mental health of the public. Public health and hygiene are not purely medical problems. They have economic, sociological and psychologic aspects which we must recognize. We must be willing to exchange ideas with workers along those lines. When we cannot lead, we should be willing and glad to work with others on a footing of equality.

Dr. Duncan B. McEachern, Chicago: Dr. Rankin simply makes a plea for what might be called historical perspective. If medical men would take a historical perspective of society, it would be quite evident that society is an evolutionary affair. We can go back before the establishment of public schools, when the education of the people was detailed to individual teachers, and we can see how unsatisfactory that method of teaching would be if applied today. The medical men of today are in the same position that the schoolteachers were before the days of Horace Mann. They are trying to apply their knowledge individually instead of *en masse*. I do not care whether you call it state medicine or not, but the activity of the medical man must be along the lines indicated by Dr. Rankin. The medical man has to accept the responsibility for this 60 per cent. untreated disease that exists in the community. The amount of disease in a community is a measure of the efficiency of the medical profession. Eventually state or public health organizations will have to take over the activity of the medical man. He has been in the habit of looking at the general public as something to exploit. A wise physician once said to me that all professions were conspiracies against the public; that the average man is out to get something from the public instead of giving something to the public. The public demands the same measure of intelligence in handling its health problems as it does in handling its educational problems. Unless the medical man will look at the matter in this light, the public will take affairs into its own hands. In the schools we might establish small clinics, and there should be several beds in schools for children who need tonsillectomies. I think that every school should be furnished with an optical department, and glasses should be furnished the same as textbooks are.

Dr. W. S. Rankin, Raleigh, N. C.: I want to say a few words regarding the activity or inactivity of the health officers in dealing with sectarian medicine. Let us see who is responsible for it. The state representatives come to the state capitol and pass laws. Those laws reflect the feeling of the people back home. They pass laws regarding sectarian medicine because the people back home have not been educated against the evils of quackery. If physicians were

organized and were in touch with collective thought, there would be no man in the state legislature voting for chiropractic and other sects. It must come back to the collective work of the men in the ranks. In an organized county in North Carolina, lectures are to be given to the people once a month dealing, among other things, with sectarian practice, chiropractic, osteopathy and all the other false doctrines that have preceded them, and there will be no legislative sentiment in support of them. The general practitioners are the soldiers in the ranks; and if they do not become active, we shall never establish this public health work. When you come to think about it, there is only one really live adult organization, and that is the church. Churches are well organized. What do they do with a new member? They try to get him to do something. It does not make any difference whether it is teaching Sunday School or what it is, but they want him to work. If he is not made active, he is not interested. If the church does not get him interested, what happens? The man does not go to church except when his conscience bothers him. He does not know what the church is doing. He misunderstands, he criticizes, he obstructs and hinders. If we can get the physicians of this country actively interested in public health work, both the profession and the public will be benefited.

POLITICS AND THE HEALTH OFFICER

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There can be no question that public health service as a career does not offer sufficient attraction to many of the best type of technically trained men, whether they are physicians, sanitary engineers or statisticians, to induce them to make it their life work. Although, in recent years, such men are entering the service in greater numbers than formerly, the need for thoroughly competent officials by states, counties and cities is far greater than the supply, and, it may be added, greater than the demand.

The reasons for this unpopularity of public health service are:

1. Lack of knowledge on the part of many graduates of the professional schools as to the character of the work, the opportunities afforded for developing it and the qualifications, technical and personal, which are essential to success. In order to furnish this information, it would seem desirable to introduce somewhere in the curriculum of medical and allied professional schools, including schools of nursing, a course of lectures, delivered by an experienced and successful health official, which would serve to impart exact information as to the opportunities offered by public health service, and to bring out facts as to the past, present and probable future of the work; its advantages as well as its disadvantages compared with private practice. It is very certain that the entrance into this field by persons who have little or no knowledge as to what is before them must, in many cases, inevitably lead to disappoint-

ment and unrealized hopes, and that many potentially able health officers are lost to the service because they have not been informed as to its opportunities and advantages.

2. Inadequacy of compensation. It may be stated, as a general rule, that salaried public service of an administrative and technical nature, in this country, if it be honestly and efficiently performed, is not adequately compensated. Public health service is by no means the least conspicuous example. It is hardly to be expected that communities, even the most populous and wealthy, will be willing and able to pay salaries to health officials which will compare with the income which many technically trained professional men command in private practice and in some industrial corporations. But that the salaries paid should represent a reasonable return on the capital invested in money and the time devoted to preparation, and should afford a decent living, with something saved, to those who have no other source of income, is beyond dispute.

The full-time health official, and even he who honestly devotes part time to the duties of his office, becomes, year by year, less able to earn a reasonable living in private practice. Health service is, for many reasons, incompatible with private practice and is usually destructive of the desire to enter or return to it; so that it not infrequently happens that, after years of such service, the health official, having relinquished or been relieved of his office for one reason or another, finds himself without means of support, and a seeker for any work which will enable him to live. The lawyer and business man who temporarily neglect their private work for public office have something to fall back on. Indeed, it not infrequently happens that their professional and business returns are enhanced rather than diminished; for there is no incompatibility between private and public work of this character, such as exists between official and private medical work. This is a

matter which state, city and county officials do not realize, and will not realize until they are taught the value to the community of efficient health work, and that such work must be reasonably paid for or dispensed with. While the pay of health officials has notably improved during the last few years, it is by no means generally adequate, and, until it becomes so, many of the best men cannot afford to enter the field of public health.

3. Uncertainty as to tenure of office. Quite as important if not more so than the foregoing as a deterrent to entrance on public health work is the uncertainty of tenure of office. Many qualified men, especially those with some private means, would, notwithstanding the meager financial returns, enter into public health service, on account of their liking for it, were it not for the fact that they have little or no assurance that even if they perform their duties satisfactorily and obtain results, they may not be thrown out of office, for political or personal reasons, and with no opportunity to protest.

The majority of adult Americans of intelligence have political opinions and more or less strong party affiliations, and it would be unfortunate for the country if such were not the case. But there is a class of politicians which exists in all parts of the country which could be well dispensed with; namely, those who are willing to sacrifice the welfare of a community to an assumed political advantage, in order to satisfy a personal or political grudge or to bestow political favors. Health officers, through no fault of their own, all too often fall victims to the activities of this shortsighted, mistaken policy; and the community is thereby deprived of valuable and faithful service.

It will be conceded that the politics of a health official should be of no more concern to a community than the politics of the family physician to an individual. There is no defense for partisan interference in the

work of an official who is devoting his service to the health and lives of the people of a community, except ignorance of the value and importance of such service; and it is this ignorance, by which the health officer suffers, for which he is very often himself largely responsible, in that he has failed to impress on the people of the community, including those with political power, the value of services rendered. In other words, he is regarded by the latter as any other office holder, and is subject to the same rules of the political game. A health officer who has accomplished such results as to enlist the support and backing of the general public in his community is fairly secure in his position. The politician who brings about the removal of such an officer, replacing him by an incompetent, is liable to receive from the people, at the first opportunity, his justly merited reward. There is no greater asset in any administration than well-conducted health work; and no other work comes nearer to the heart of the people or so generally enlists public cooperation. This fact is being recognized more and more clearly by governors, mayors, commissioners and minor administrative officials. If it be granted that health officials should be free from political interference, it is equally true that they themselves should perform their duties without regard to political or personal influence, and that they should on no account take part or use the prestige of their office in any partisan campaign. Wherever their sympathy lies, in their official acts they should remain absolutely neutral. The health officer who openly or privately works for the advancement of one political party or another is entitled to no sympathy if, as a result, he loses his office. He has played a game, lost it, and should pay—on demand.

Health officials should work in as close harmony as possible with the administration, and cooperate in making it a success. They should remember that the technical knowledge pertaining to public health work and

its importance to the community is not often possessed by coordinate lay officials; and when differences of opinions arise as to policy relating to health administration, they should make every endeavor to render clear their position and reasons for acts, the value and desirability of which are being questioned, often through lack of understanding. Tactlessness, arrogance and too great readiness to attribute evil motives to those with whom officially and unofficially they come into contact are just as certain indications of unfitness for public health service as subservience and eagerness to curry favor at the sacrifice of plain duty. However technically qualified by education and experience, the health officer, if constantly at odds with the administration, will be able to accomplish little or nothing, and his services to the community will be of very little value. If this lack of amicable relationship is due purely to political or personal motives on the part of members of the administration and to no fault of his own, his work having met the approval of the people of the community, the health officer may, in most cases, rely on public support, which is exceedingly difficult to overcome. If, on the other hand, it is a question of incompatibility of temperament, or the health officer is suspected or known to be playing politics, it is better for him and the community that he should resign.

What may be done to make more secure the tenure of office of efficient health officers? Civil service, while theoretically valuable for this purpose, has not, in effect, proved much of a deterrent against unjust removal from office. The state department of health of New York through the public health council, and in cooperation with the state legislature and conference of mayors, has taken certain steps which should prove of value in remedying this evil; first, by an act of the public health council, July 6, 1915, in establishing qualifications for local health officers, except those of the first and second class cities. Under this regulation,

candidates for health officerships are obliged to qualify themselves by taking a public health course outlined and supervised by the state department of health in cooperation with one of the medical schools of the state, or, in lieu of such course, to furnish to the council evidence of education and training in public health which shall represent an equivalent of the work required by the course. Although handicapped by the war and two great epidemics, up to the present time about 600 health officers out of 969 have either taken this course or otherwise qualified, and about 150 are now registered in it. This regulation has served to prevent the appointment of men who were not qualified to hold office, and to educate the appointing power in the various communities as to the necessity for choosing men with some training in public health, and not those, however respectable, who are simply medical practitioners and without knowledge of public health matters. In the majority of cases, it has rendered it difficult for such appointing power to displace the health officer whose qualifications had been approved.

In 1921, at the instance of the conference of mayors and the state department of health, a law was passed, permissive in character, by which second and third class cities may abolish boards of health, and empower the mayor or city commissioner to appoint the health officer, who, however, must be qualified under the regulations of the public health council. It makes the health officer responsible for the conduct of his office solely to the mayor or other appointive power, and not to an intermediary lay official, such as a public safety commissioner. The term of the health officer was fixed at four years, but he could be removed without specific charges. The latter provision obviously constituted a weakness in the law. This was remedied at the last session of the legislature, which made the health officer removable on charges only after a public hearing. A number of cities have accepted this law, and more con-

template doing so. Furthermore, the newer city charters include identical provisions. These two measures, I believe, should be regarded as a step in the right direction, but only a step. City and county health officers (certainly those who give full time to these positions) should have a life tenure of office, unless sooner removed for cause; and, until the salaries granted are more liberal than at present, some provision should be made for a pension after retirement.

It is quite obvious that causes for discontinuing the services of a health officer should include inability to achieve results after a reasonable period of trial; for I think it will be readily granted that, however well qualified a man may be in theory, when it comes to actual experience he may prove to be far from a success; and communities should not be powerless by law to rid themselves of a health officer of this kind.

It is perhaps too much to expect that in the near future adequately paid, well qualified, whole-time health officers, with a secure tenure of office, will be the rule rather than the rare exception. This state of affairs can be brought about by one means alone: general education of the public regarding the meaning and importance of efficient health administration.

ABSTRACT OF DISCUSSION

Dr. A. T. McCormack, Louisville, Ky.: There is not a statement in the paper with which I disagree, and that makes it extremely difficult to say much except in repetition. It has always seemed strange why after forty years the physicians of the United States have not realized the possibility of such an organization as will entitle them to such public confidence that the standards suggested in Dr. Nicoll's paper would be accepted by the public and the profession today. It is impossible for the mayor to know a good health officer. He may appoint a good health officer. I do not mean he cannot do that because it has been done occasionally. It does not necessarily happen that he is a good health officer because he is the family physician or political supporter of the mayor; and too frequently health officers are appointed for that reason. If the appointments of health officers were made by law under the endorsement of the medical profes-

sion, which, after all, should be responsible for the public health of the state, with the provision that they must handle the financial affairs of the organization economically, the results would be better. That provides sufficient continuity to make the proposition attractive even though the remuneration is small, not because the health officer should not receive a greater remuneration but because he has such an opportunity for good service that he feels compensated out of proportion to the amount of money he receives.

Dr. Victor C. Vaughan, Washington, D. C.: I agree with all that Dr. Nicoll has said. It has been my fortune to be in public health work for many years, and I think that, on the whole, Dr. Nicoll is right in advising the health worker to steer as far as possible from active participation in politics. In Michigan, where my health work has been done, I have generally been known as a Democrat, and at times have taken a rather prominent part in state conventions of this party. During this time, or at least during the greater part of it, the state has been overwhelmingly Republican. I do not believe that my political belief or my political affiliation has in any way interfered with my health work. My most successful work along health lines has been carried out in legislatures in which my party had but few representatives. Of course, a tactful man, and a health official must be tactful, will always be courteous, especially to his opponents. I do not attach as much opprobrium to the word "politician" as some persons do. The politician is the man who persuades his fellow citizens to vote this way or that; and, if he persuades them to do that which is for the benefit of the whole, I am quite sure that he is accomplishing a desirable work. In my opinion, epidemiology is not studied with deserved thoroughness in this country at this time. It seems to be a general opinion among medical men and nonmedical health workers that bacteriology and epidemiology are synonymous. This is far from being true. Epidemiology is the much broader term, the much older science, and the one about which I believe less is known now than was the case a hundred years or more ago. When pestilence was more frequent, the words "loimology" and "loimography" were in general use, both by the medical profession and by the learned laity. Loimology was defined in the old dictionaries as the sum of human knowledge concerning pestilence, and the epidemiology of many diseases was quite extensively known long before the science of bacteriology came into existence.

Dr. J. A. Hayne, Columbia, S. C.: In South Carolina we embody most of the recommendations that have been laid down in the papers read today. When many of the states of the Union were wildernesses, the state of South Carolina made its medical profession the state board of health of

South Carolina, and made it so by law. To get the best out of the medical profession in other states, it should be made the state board of health. Then there will be an ideal board of health. The state board of health of South Carolina has survived since 1879. This has been due to the intelligence of her health officers.

DR. MATTHIAS NICOLL, JR., Albany, N. Y.: I trust that no one will conclude from what I have said that we in New York state are wholly lacking in political judgment. I do insist, however, that conditions are different with us than in the state from which Dr. Vaughan comes, where one party is always in power, while in New York state there is a change in administration every few years. I would not give a penny for the health official who is not a politician in the sense of using political judgment in putting his own work across. If he cannot do that he is lacking as an administrator. Dr. Vaughan, a Democrat, was a health officer in a Republican state, and no Democrat or Republican dared to remove him; but I contend that it is unnecessary and dangerous for a health official to mix in partisan politics. He should confine his political activities to the conduct of his own office; in other words, attend strictly to his own business. By so doing, and always provided his work meets the approval of the general public, he will usually be safe from political interference. If, on the other hand, he uses his office for partisan purposes he will suffer the inevitable consequences sooner or later and have only himself to blame.

TUBERCULOSIS AMONG THE EX-SERVICE MEN

WITH A SPECIAL REFERENCE TO ITS BEARING ON PUBLIC HEALTH

HUGH S. CUMMING, M.D.
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WASHINGTON, D. C.

A general impression apparently prevails among the laity that the incidence of tuberculosis was greatly increased in the United States by the World War. It is not surprising that this idea is current. Care of the disabled has naturally been a matter of general solicitude. Difficulties encountered in providing sanatorium treatment were given wide publicity and sometimes exaggerated. Moreover, the appalling increase in tuberculosis which occurred during the war in most countries of Europe, and which still prevails in Austria and Russia, has become common knowledge. Among all those nations, including some nonbelligerents, whose food supplies were seriously affected and which felt keenly the stress of war and its results, tuberculosis increased, indeed, to an alarming extent. It is natural, therefore, although this country was fortunately spared the pinch of famine, the desolation of invasion and many of the fears, griefs, deprivations and other forms of stress which try the spirit, waste the body and therefore predispose to tuberculosis, that our citizenry should anticipate an increase of tuberculosis here and, in the same pride with which they demanded a place in the fighting line, count their casualties in kind.

It may be recalled that in 1919, when making a forecast of hospital needs, it was estimated by the Public Health Service that approximately 12,000 beds would

be required within two years for tuberculous veterans. It is also a fact that by the end of April, 1922, there were 11,346 tuberculous veterans hospitalized at government expense in the United States, as well as considerable numbers receiving compensation for that disability who declined hospital care. The incidence of tuberculosis was, however, only slightly increased in the United States during the war, either among males of military age or any other class of population. The forecast of hospital needs referred to above, which has proved to be approximately correct, was made merely in accordance with the known incidence of tuberculosis among the general population in the age groups concerned. A glance at the curve (Fig. 1) shows how sensitive the tuberculosis mortality is to collateral influences. The slight but perceptible rise in 1916 and 1917 is presumably due to the increase in living costs or perhaps, more exactly, the degree to which this increase exceeded that in wages or other rewards for production. To these causes must be added in 1918 that of the epidemic of influenza. There seems little doubt that these increases were not related to actual participation in the war.

The curve (Fig. 2) comparing the mortality rates of 1915 and 1920, shows a marked postwar decline in tuberculosis mortality which is even more marked among males, including those of military age, than among females. It is, I think, generally accepted that the incidence of tuberculosis in any country, in both sexes and at every age except infancy and childhood alone, reflects with great precision the living and industrial conditions prevailing. It is therefore not strange that tuberculosis was not increased among our troops, who were generally well fed, well housed, and well clothed, or, except to a very slight degree, among the population as a whole.

The War Risk Insurance Act of Oct. 6, 1917, promised hospital care to disabled veterans, but made no

provisions for the construction or operation of hospitals, nor did it name the agency whereby the proposed care was to be provided. It was, of course, impossible to reckon at that time with the desire which manifested itself, as soon as the armistice was signed, for discharge from military and naval service. This prevented extensive use of military and naval hospitals for discharged men, who usually evidenced a distaste for all things connected with military life. It was a perfectly

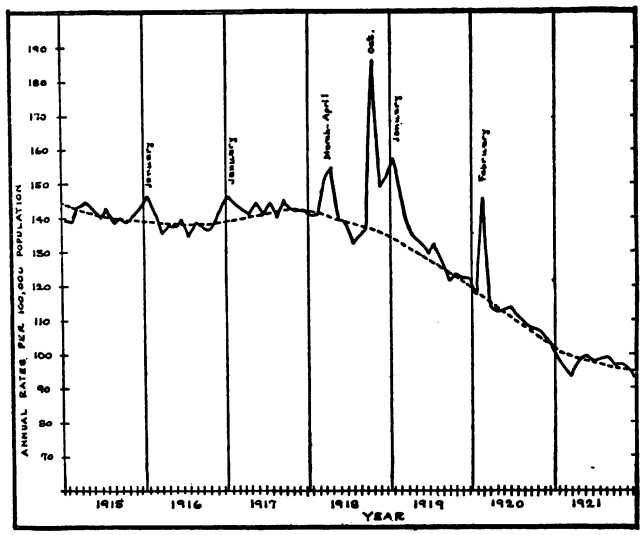

Fig. 1.—Recent decline in mortality from all forms of tuberculosis; monthly rates from 1915 to 1921 in twenty-four states (in 1921, provisional data for only fifteen states were available), normal seasonal variation having been eliminated.

natural reaction, considering the psychology of the situation, and one which in no way reflects upon the excellent treatment provided by the Navy and Army hospitals.

It was not, therefore, until March 3, 1919, that by act of Congress the Public Health Service was named as the principal agency whereby hospital and medical care was to be provided. The emergency was serious. To place a properly trained physician in each city or

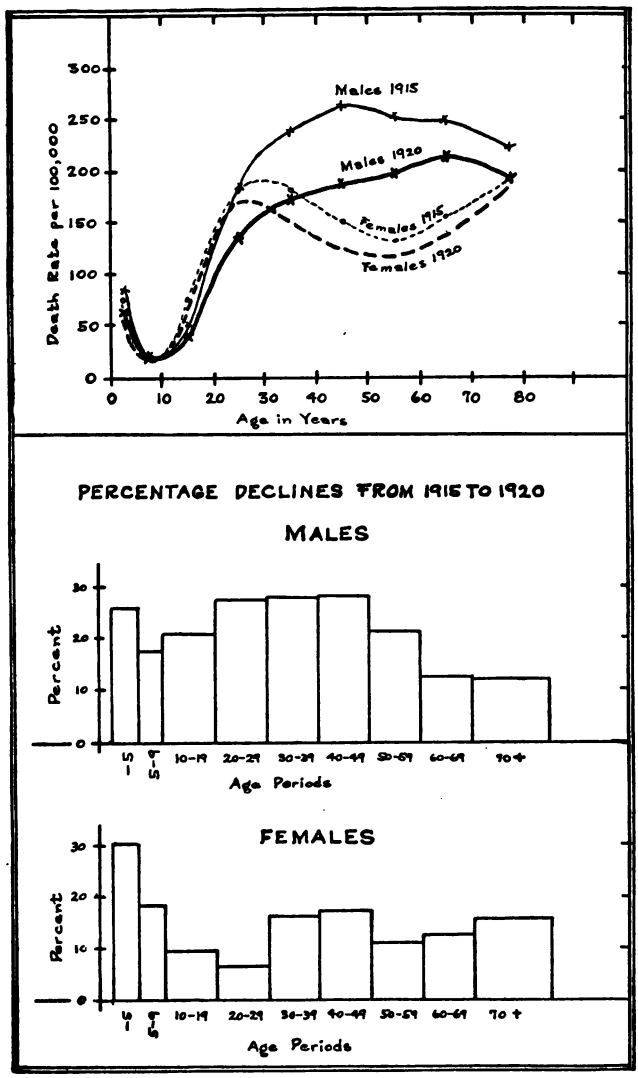

Fig. 2.—Specific death rates for all forms of tuberculosis in twenty-four registration states compared for 1915 and 1920.

large town in all parts of the United States, to find hospital beds for the widely scattered disabled veterans who applied for examination and treatment in all parts of the United States, and to equip, man and operate such institutions in various parts of the country as could be converted to hospital use—these were some of the urgent problems that arose. The tuberculosis patients caused considerable concern, and it was early apparent

TABLE 1.—MORTALITY FROM TUBERCULOSIS IN THE UNITED STATES, 1915 AND 1920*

Age Period (Years)	Death Rate per 100,000 Males		Death Rate per 100,000 Females		Per Cent. Decrease in Mortality in 1920 Over 1915	
	1915	1920	1915	1920	Males	Females
All forms:						
All ages.....	156.1	117.2	124.4	107.8	24.9	13.3
Under 5.....	84.5	62.5	77.2	53.9	26.2	30.2
5- 9.....	22.6	18.6	22.9	18.7	17.7	18.3
10-19.....	49.6	39.3	76.1	68.9	20.8	9.5
20-29.....	186.3	134.5	184.3	172.2	27.8	6.6
30-39.....	240.7	173.0	183.1	153.2	28.1	16.3
40-49.....	263.9	189.0	152.4	125.6	28.4	17.6
50-59.....	252.9	198.2	134.1	119.3	21.6	11.0
60-69.....	248.4	216.6	158.7	138.7	12.8	12.6
70 and over..	220.2	193.5	193.4	162.8	12.1	15.8
Pulmonary tuberculosis:						
All ages.....	136.0	102.9	107.5	94.1	24.3	12.5
Under 5.....	25.8	21.2	25.7	18.2	17.8	29.2
5- 9.....	7.9	7.0	9.9	8.9	11.4	10.1
10-19.....	40.3	31.6	66.8	60.2	21.6	9.9
20-29.....	171.2	124.6	171.8	160.8	27.2	6.4
30-39.....	225.1	162.6	169.9	143.2	27.8	15.7
40-49.....	245.1	177.1	140.2	113.9	27.7	18.7
50-59.....	234.1	184.1	120.4	106.9	21.4	11.2
60-69.....	226.1	199.5	141.7	125.3	11.8	11.6
70 and over..	196.3	177.8	173.9	141.5	9.4	18.6

* Specific death rates per hundred thousand for males and females compared for 1915 and 1920 in twenty-four registration states, with percentages of decrease; on revised intercensal population estimates for July 1, 1915, and July 1, 1920, but using the 1915 sex and age distribution. The twenty-four states are those constituting the death registration area in 1915. Acknowledgments are made to Dr. W. H. Davis, Chief Statistician for Vital Statistics, Bureau of the Census, for the use of mortality data from original tabulation sheets.

that the emergency hospital provision was at once necessary. Congress, in failing to act favorably on the recommendations contained in House Document 481, which was transmitted by the Secretary of the Treasury, Dec. 8, 1919, reflected the idea, not wholly extinct among medical men, that permanent hospitals are not necessary for the treatment of tuberculosis. The esti-

mates made in House Document 481 provided for the construction, among other institutions, of nineteen hospitals for tuberculosis, with an aggregate capacity of 9,330 beds, at an approximate cost of $32,500,000. This was for tuberculosis hospitals alone. The plan contemplated the construction of permanent institutions located near the centers of population to be served. It visioned ample grounds, with lawns and trees, and restful environments in salubrious but not isolated places. Unfortunately, however, the treatment of tuberculosis became associated in its early history with the tent, the shack, the lean-to, with life in the open under primitive conditions. The early advice, "Go West, and rough it," was recalled. It was necessary to explain again and again that a tuberculous patient needs highly specialized care, calling for modern hospital facilities. It was necessary for this conviction to find place gradually, and for public sentiment to lead the way to the necessary appropriations.

As an evidence of the difficulties encountered at one critical period, it may be mentioned that on Dec. 24, 1919, the President approved the amendment to the War Risk Insurance Act, which increased the allowance for total temporary disability from $30 to $80 a month. On the same day, in anticipation of an increased number of claimants, the Public Health Service solicited the assistance of the American Legion to find additional hospital accommodations for tuberculous patients, believing that the criticism which the government was at that time facing might be in part ameliorated or its cause mitigated by concerted effort of the comrades of those needing treatment, to find hospitals suitable for their care. The Legion, in response, sent out requests from its headquarters to posts in all parts of the United States, and its members cooperated with our field officers to the desired end. A glance at the chart will show the extent to which contract hospitals were utilized in

this very trying period. We are all familiar with the criticisms which arose concerning their use. I have no apologies to make. The institutions were representative of the medical care prevailing in the respective communities at that time. Some of the institutions were excellent. Others were unsuitable, and these were abandoned as rapidly as their unsatisfactory condition was determined by the district inspectors detailed for

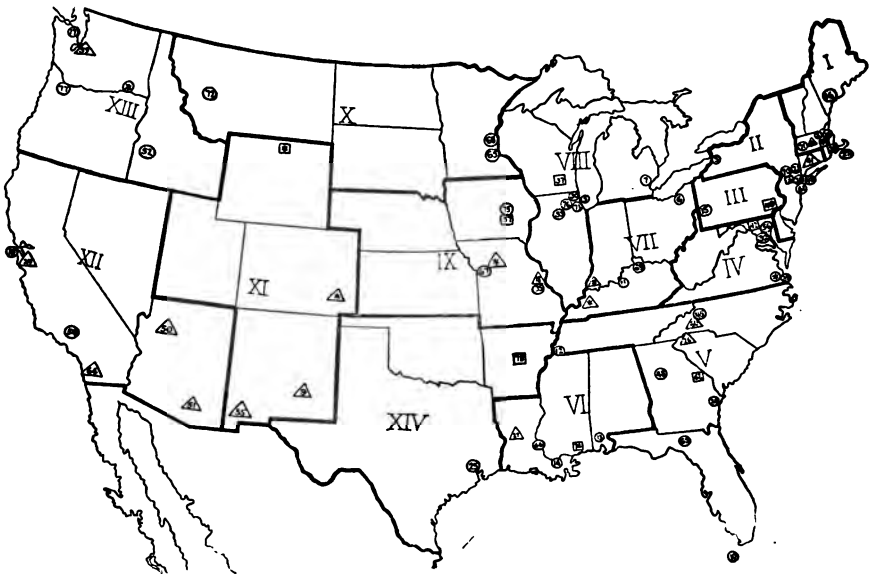

Fig. 3.—Location of United States Public Health Service Hospitals, January, 1922: circles indicate general hospitals; triangle, tuberculosis hospitals; squares, neuropsychiatric hospitals, the numbers being definitely located in Table 2.

the duty. Whether it would have been better for the federal government to arrange with state sanatoriums and those operated by other political units for the care of all tuberculous patients in this manner is open to question. The plan had many advocates among members of the National Tuberculosis Association. A plan whereby such hospitals might have been enlarged by federal funds for tuberculous veterans was foredoomed

to failure because of the distaste evidenced on every hand to the admission of veterans to any hospital which cared for free patients, or, according to the vernacular, "charity patients." Objections were made to the use of state sanatoriums, county sanatoriums, and such excellent institutions as Oak Forest in Chicago, Seaview Hospital in New York City, and the Branch Hospital in Cincinnati. There appeared, therefore, no choice but to proceed with the development of temporary hospitals for which some funds were provided but which, according to the law, could not be used for permanent construction.

The character of the temporary army hospitals of the cantonment type is too well known to merit a description. The widely separated, one story wards, the connecting corridors with numerous inclines, the numerous heating units, the fire risks, the difficulty of supplying hot food, are well known. The sagging foundations, warped floors and leaky roofs of these temporary buildings were eloquent allies at a time when it was necessary to plead for new hospitals. Some of the attacks made upon the government, notably in the case of the Fox Hills Hospital, were, possibly, not wholly devoid of a well-meant but ill-advised effort to force the appropriation of necessary funds to build permanent institutions.

The tuberculosis hospitals taken over from the Army, in addition to those at Markleton, Pa., and Deming, N. M., which were abandoned as unsatisfactory as soon as more suitable hospitals had been obtained, were:

No. 24, Palo Alto, Calif., 650 beds.
No. 26, Greenville, S. C., 700 beds.
No. 27, Alexandria, La., 600 beds.
No. 41, New Haven, Conn., 500 beds.
No. 50, Prescott, Ariz., 765 beds.
No. 55, Fort Bayard, N. M., 1,120 beds.
No. 60, Oteen, N. C., 1,100 beds.
No. 64, Camp Kearney, Calif., 550 beds.

To supplement these, a temporary hospital of 290 beds, intended chiefly for winter use, was established at Tucson, Ariz., at Pastime Park, cottages built from salvaged lumber supplementing the existing buildings. The abandoned Indian School at Tacoma, Wash., was also converted into a temporary hospital of 278 beds. One of the difficulties in operating hospitals of this group was the lack of quarters for personnel. The Public Health Service has a corps of commissioned officers, but lacks an enlisted personnel. Its employees are all civilians who may leave at will and whose contentment is often conditioned on the presence of their families, of schools, social advantages, and other refine-

TABLE 2.—HOSPITAL ACTIVITIES OF PUBLIC HEALTH SERVICE

Veterans admitted to hospital	264,000
Hospital relief days	14,397,500
Outpatient (dispensary) treatments	2,042,200
Physical examinations	1,459,200
Note—The normal hospital operations of the Public Health Service, in providing relief for merchant seamen and its other beneficiaries in the twenty-five marine hospitals still remaining, amounted last year (one year only) to the following:	
Old line patients admitted to hospital	44,756
Hospital relief days	1,121,171
Physical examination	79,759

ments of living not demanded or expected under military conditions. From the patients' point of view it must also be admitted that the gloomy outlook afforded by the war time buildings, now four years old, is depressing.

From the beginning of the work by the Public Health Service, the hospitalization and the transfer of patients was, so far as possible, decentralized. A disabled soldier coming under observation at any point in the field and found to be in need of hospital care was immediately offered it, if not in one operated by the government, then in the best contract hospital available. According to a custom which has prevailed in the Public Health Service for more than a hundred years, tuberculous patients are routinely admitted as a temporary measure

to any of its general medical and surgical hospitals. The tuberculosis wards in our hospitals in Boston, New York, Baltimore, Chicago and other large cities, which were important clearing stations, often contained several hundred patients each. The tuberculous patients at Fox Hills, indeed, sometimes outnumbered all others. The resolution which the American Medical Association adopted at the Boston session last year, advocating this practice for civil hospitals, has served to disarm unjust criticism and to strengthen the government in a useful practice. Your action, therefore, wisely taken in the general interests of public health everywhere, has served the government in a trying administrative problem.

The demand for climatic change was another heritage from an earlier generation. Tuberculous patients and their friends demanded a transfer to special climates from northern, southern, eastern, western and central portions of the United States. The spirit of restlessness engendered by the war was manifest. As a further evidence of this, a popular report is current that 25,000 tuberculous ex-soldiers are found to have migrated to Colorado alone, only 2 per cent. of the hospital patients coming under observation in that state being natives of Colorado. It was necessary to refuse many unwise requests for the removal of tuberculous patients, unsuited by reasons of physical condition, from hospitals where they were under treatment to other hospitals in the arid Southwest. So far as I am aware, however, there are no instances in which a sick man in any part of the United States was not provided with or at least offered hospital care, of the standard prevailing in that community, without more than a few days' delay. The most insistent demands were made for the transfer of terminal cases. "Give this dying man a chance" was a frequent expression typical of the character of requests daily received. It was exceedingly difficult and sometimes futile to attempt to explain

that the importance thus attributed to climatic influence is out of harmony with modern scientific thought, nor was the problem rendered easier by the fact that large numbers of reputable physicians throughout the country appeared to entertain views long since believed obsolete.

The hospitals devoted to the care of veterans were manned almost exclusively by personnel from the military and naval forces. Medical officers, nurses, reconstruction aides, dietitians and laboratory technicians were almost without exception with military experience, many of them having served overseas. All, therefore,

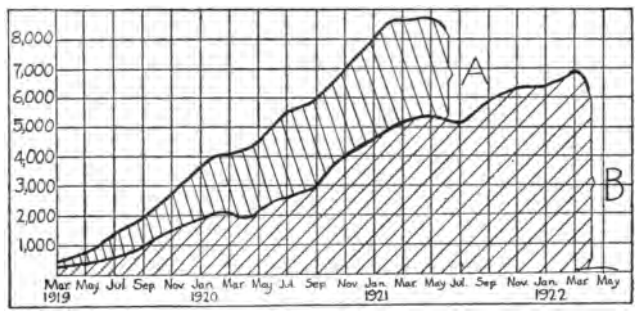

Fig. 4.—Hospital care of tuberculous veterans of the World War, U. S. Public Health Service, March, 1919, to June, 1922; patients in army, navy and soldiers' home hospitals not included. *A*, contract and other institutions; responsibility and control transferred to the U. S. Veterans' Bureau, June, 1921. *B*, Public Health Service hospitals; administration of veterans' hospitals transferred to U. S. Veterans' Bureau by executive order, April 29, 1922.

were well prepared to sympathize fully with the needs of their patients. The American Legion is well represented in membership among both patients and personnel, and at some of the hospitals the local post constitutes the largest in the community, and sometimes the largest in the state.

It need cause no surprise that special training in tuberculosis for officers was necessary. The lack of adequate instruction in this specialty in most medical schools is well known, while the exclusion of tuberculous patients from general hospitals, a still all too common custom, and the practice of sending tuber-

culous patients "away" have combined to alienate the average physician from a knowledge of tuberculosis. The excellent Army schools in tuberculosis which were conducted under the auspices of Col. George E. Bushnell, Retired, had trained a considerable number of Army medical officers, some of whom continued on duty with the Public Health Service. With these and a few other skilled men as a nucleus, the training of a sufficient number of medical officers was undertaken to provide proper care for patients in hospitals. A summer school was conducted at Oteen, and numerous short courses in diagnosis held at various places, every tuberculosis hospital being required to give its medical personnel a prescribed course in training which, during the last three years, has naturally been applied to a considerable number of medical officers stationed therein or assigned for the purpose. Dr. Palmer, who, together with Dr. Boswell, has consented to discuss my subject, is one of the five experts who were engaged to visit our tuberculosis hospitals to assist in establishing a suitable standard of treatment and to strengthen weak points. Since he visited more hospitals and visited them oftener than the others, he is perhaps better qualified than any other person to tell impartially, just as he told me in his official reports, the facts about the hospitals as he found them.

It is not possible to tabulate the tuberculosis patients with respect to the stage of disease in which they were admitted, these figures not being available at the present time. Many were admitted with doubtful diagnosis, claiming compensation for and giving a history of symptoms which indicated tuberculosis. Some of these had been exposed to war gases or were convalescent from epidemic pneumonia. In all, approximately 65,000 veterans were admitted to hospitals, including both government and civil institutions, up to May 1 of this year. It early become necessary to differentiate between patients having tuberculosis for which they required treatment and those with healed or quiescent

tuberculosis which did not require hospital care. Numbers of patients were discharged within a few weeks after admission, a board of properly qualified medical officers having determined that they were nontuberculous, in a clinical sense.

TABLE 3.—LOCATION OF UNITED STATES PUBLIC HEALTH SERVICE HOSPITALS

No.	Location	No.	Location
2	Boston	49	Philadelphia
3	Buffalo	50	Prescott, Ariz.
5	Chicago	51	Tucson, Ariz.
6	Cleveland	52	Boise, Idaho
7	Detroit	53	Dwight, Ill.
8	Evansville, Ind.	54	Arrowhead Springs, Calif.
9	Fort Stanton, N. M.	55	Fort Bayard, N. M.
10	Key West, Fla.	56	Baltimore
11	Louisville, Ky.	57	Knoxville, Iowa
12	Memphis, Tenn.	59	Tacoma, Wash.
13	Mobile, Ala.	60	Oteen, N. C.
14	New Orleans	61	Staten Island, N. Y.
15	Pittsburgh	62	Augusta, Ga.
16	Portland, Me.	63	Lake City, Fla.
17	Port Townsend, Wash.	64	Camp Kearney, Calif.
18	St. Louis	65	St. Paul
19	San Francisco	66	Carville, La.
20	Savannah, Ga.	67	Kansas City, Mo.
21	Stapleton, N. Y.	68	Minneapolis
22	Vineyard Haven, Mass.	69	Fort Thomas, Ky
24	Palo Alto, Calif.	70	New York
25	Houston, Texas	71	Sterling Junction, Mass.
26	Greenville, S. C.	72	Helena, Mont.
27	Alexandria, La.	73	Chicago
29	Norfolk, Va.	74	Gulfport, Miss.
30	Chicago	75	Colfax, Iowa
32	Washington, D. C.	76	Maywood, Ill.
34	East Norfolk, Mass.	77	Portland, Ore.
35	St. Louis	78	North Little Rock, Ark.
36	Boston	*	Sheridan, Wyo.
37	Waukesha, Wis.	*	Dawson Springs, Ky.
38	New York	*	Walla Walla, Wash.
41	New Haven, Conn.	*	Excelsior Springs, Mo.
42	Perryville, Md.	*	Las Animas, Colo.
43	Ellis Island, N. Y.	*	(Bronx) New York
44	West Roxbury, Mass.	*	Norfolk, Va.
45	Biltmore, N. C.	*	Rutland, Mass.
48	Atlanta, Ga.		

* The asterisks and the numbers are reproduced on the map (Fig. 3).

While final statistics have not been published, the general impression prevails that war gases were not an important cause of clinical tuberculosis. In this connection, the following observation made by the Surgeon General of the Army in a recent report is pertinent: "In the year 1918 there were one and one-half times as many cases of tuberculosis per thousand among all troops in France as there were among those

gassed, and in 1919 there were more than one and three-fourths times as many tuberculosis cases per thousand among all troops as there were among the gassed troops."

The mental attitude of patients is indicated in some measure by the fact that out of 9,200 patients discharged from service hospitals between July 1, 1921, and May 1, 1922, 3,132, or more than one third, left against advice and without permission, treatment not having been completed. Those discharged for disciplinary reasons during the same period numbered 189. Many of these patients, presumably, sought readmission to other hospitals in accordance with the spirit of unrest which still prevails, although to a less degree than formerly, among ex-service men. The frequency of departures from the hospital against medical advice has been ascribed in part by experienced hospital executives to the custom whereby the Veterans' Bureau provides transportataion home for those so departing for the first time. Homesick men, at some distance from their friends, and finding sanatorium regimen irksome, are tempted to take advantage of this opportunity to return to their families. Men also who have at their own expense unwisely sought climatic treatment at distant places may enter the nearest government hospital, even for the express purpose of claiming transportation home. It is somewhat significant that the small temporary hospital at Tucson, Ariz., with a capacity of less than 300 beds, discharged 488 against advice between March 15, 1920, and April 23, 1922, which is more than half of its total discharges during that period. This hospital is one to which, with few exceptions, no transfers are made by the government, as it is merely an emergency hospital for ex-service men found in Tucson in need of medical care.

Special treatments, including induced pneumothorax, heliotherapy, both natural and artificial, occupational therapy, including physiotherapy, and vocational train-

ing as applied therapeutic exercise, were encouraged in all the tuberculosis hospitals. Some of the best results in tuberculous laryngitis were obtained at hospitals in the arid Southwest with sunlight and silence. Some research work related to the presence of small pneumothorax as a common but hitherto unrecognized accompaniment of active pulmonary tuberculosis was carried out at New Haven by Surgeons Barlow and Thompson, the results of which will shortly be published as a bulletin of the Hygienic Laboratory. The number of cases of bone and joint tuberculosis coming under observation has been rather surprising, approximately 3 per cent. of tuberculous patients admitted to hospital having nonpulmonary disease. Of these, approximately two thirds had involvement of the bones and joints.

Remembering that approximately one third of all veteran hospital patients are the tuberculous, an idea of the operations relating to this class may be obtained from the summary of the total hospital activities of the Public Health Service during the three years since the work was undertaken, given in Table 2.

The medical work which the Public Health Service was called on to perform for the Bureau of War Risk Insurance and its successor, the U. S. Veterans' Bureau, is now history. The field organization, including the fourteen district supervisors' offices and their subagencies reaching practically into every county of the United States, was turned over in June, 1921. The control of contract hospitals was relinquished also at that time. The Veterans' Bureau, having further perfected its organization, finally felt itself ready to assume the administration of the veterans' hospitals. which were accordingly turned over to Director Forbes by executive order, May 29, 1922. This transfer consisted of fifty-seven hospitals, with 17,500 beds, 13,057 patients (of whom 5,271 were tuberculous), and a personnel of 11,347, including 925 physicians and dentists, 1,425 nurses, 425 reconstruction aides, and 110

dietitians. I take this occasion to pay public tribute, before a body which has ever honored fidelity, to the professional men and women who, having been identified with the organization and operation of these hospitals for many months during very trying periods, were transferred from the Public Health Service to the Veterans' Bureau for continued duty of the same character. Their loyalty has been instant and unvarying, their patience untiring, their zeal unflagging, and their devotion unfailing in the cause of the disabled veteran and the government, whose obligations they strive to fulfil.

ABSTRACT OF DISCUSSION

Dr. Henry Boswell, Sanatorium, Miss: There are a number of tuberculous soldiers in this country, for the ex-soldiers are breaking down very rapidly. I should like to emphasize that in the state of Mississippi, where we examine all soldiers and civilians, we are not having any more ex-soldiers with tuberculosis than we find in the civilians, of like age group. With reference to the isolation of these men and their care, we should try in every possible way to establish scientific institutions for the treatment of tuberculosis and to get out of the minds of the civilian population the idea that tuberculosis can be successfully handled in tents and shacks. One certainly does not get results in tents and shacks. About three years ago I made a survey of the institutions of North America in order to arrive at some solution of the problem. I found that like institutions well built with scientific equipment got like results no matter where located, except in the state of Maine. There, perhaps, the difference was due to the long period of cold weather. The only other thing I should like to mention is the constant demand by the people on the medical profession to change soldiers from one place to another. I remember one case which Dr. Cumming's paper brought to mind, in which we had considerable trouble in getting the patient's relatives to leave him with us. He had an acute miliary tuberculosis. His people succeeded in getting him transferred, and he died on the train somewhere in Colorado before he reached Fort Bayard.

Dr. H. A. Pattison, New York: Through the courtesy of Dr. Cumming and the heads of other executive departments of the government, it has been the great opportunity and privilege of the National Tuberculosis Association to cooperate with the government in developing facilities for the care and treatment of tuberculous ex-service men. As supervisor of the medical service of the national association, it has been

my lot to do a considerable part of the work. I had the opportunity to look into every corner of many of the Public Health Service sanatoriums, and of seeing how the Public Health Service found itself when, without adequate equipment, this great problem was forced on it. Without adequate legislation, physical equipment or sufficient appropriations, thousands of sick men were thrown on it suddenly. I should like to pay sincere tribute to the executive departments in Washington and to our medical and nursing friends in the hospitals for their devoted work in carrying on under great difficulties. Before the congressional committee, headed by Senator Walsh, I answered the question as to the reasons for these serious difficulties by saying that I considered them due to definitive and restrictive legislation. The committee agreed with me, and the country was assured that very shortly Congress would dispose of that by legislation, making it possible to meet the situation. As an example of the difficulty in the cantonment hospitals, take Palo Alto, Calif. The California laws do not permit of the barring or screening of any windows even in one-story frame buildings. It is therefore impossible to control the neuropsychiatric patients, who have ready access to narcotic and liquor pedlers when their compensation checks arrive. On the other hand, at Boise, Idaho, where there is better supervision, we have one of the best equipped and managed hospitals of this country in charge of the Public Health Service. At Greenville, with an old broken-down cantonment base hospital and the buildings painted in every conceivable color, there was splendid morale and splendid work being done under the most adverse conditions. The President recently transferred from the Public Health Service to the Veterans' Bureau about thirty-nine hospitals. The Veterans' Bureau has not had the hospital experience of the Public Health Service. Only time will tell whether the Veterans' Bureau will go on with the splendid work the Public Health Service has been conducting, or whether we shall have just domiciliary care rather than real treatment.

Dr. J. J. Singer, St. Louis: Dr. Cumming brought out some very important points in relation to tuberculosis surveys of the general public. In one of his charts he states that the adjusting of conditions is reflected in the mortality of tuberculosis. This was very evident during the war period, at which time the death rate seemed to have diminished, though in the last few years it has somewhat increased. The Public Health Service has brought out, to my mind at least, and answers the question of whether tuberculosis is a medical disease or whether it is a public condition, a medical problem or a social problem. I have seen a large number of cases diagnosed as tuberculosis and the patients given a pension of from $30 to $80 a month. Those are the patients who have been doing well. Those are the patients who have not gone out to work, but have stayed at home or gone to private

hospitals or physicians. The strain of providing for themselves has been removed. If the Public Health Service has done nothing else but this, its work is worth while. The second point that the Public Health Service has brought out is the training of physicians in tuberculosis diagnosis. To those working in tuberculosis it is generally recognized that early recognition must be done by the general practitioner. The Public Health Service has turned out innumerable men all over the country who are trained in a tuberculosis clinic, and in that way they serve the cause.

Dr. H. S. Cumming, Washington, D. C.: We have been trying to educate the average physician to the work in tuberculosis by establishing a school at Oteen, N. C. I hope that the physicians will continue to be interested in one of the greatest public health measures.

CONTRIBUTION OF STUDENT HEALTH SERVICES TO PUBLIC HEALTH

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URBANA, ILL.

A health service is neither an institution of philanthropy nor an organization for the promotion of paternalism. It strives to cooperate, not to compete, with the medical profession. It augments rather than decreases the practice of local physicians. It has nothing to do with either compulsory health insurance or contract practice.

It functions solely in the interest of sound economy by keeping the maximum number of students in the classroom and by insuring the investment in education by teaching elementary knowledge of the human machine, which each student must handle for the remainder of his life. It endeavors to keep the normal fit; to restore the ill quickly to health.

Health, as defined by it, is not merely the absence of disease, but the sustained striving for physical, mental, and moral perfection—constructive, dynamic living in the best environment that modern science is capable of producing. Its purpose is to bring to the student, and through him to his community, the principles of hygiene and sanitation, as they pertain to him, to his home and to his vocation.

Instruction to produce the necessary education—to promote this essential cooperation in making sanitary improvement more nearly commensurate with sanitary knowledge—must present a demonstration so clearly as to make the proper deduction inevitable. Periodic physical examinations, personal conferences, physical education, sanitary inspection and didactic instruction

offer this opportunity for a student health service to make a distinct contribution to public health.

PHYSICAL EXAMINATIONS

A thorough physical examination benefits the student, the community and the medical profession. It warns of dangerous conditions of which the student may not have been aware. Persistent albuminurias, unsuspected heart lesions and unrecognized hernias are frequently found. Their discovery and treatment mean a longer period of activity in those who, by special training and experience, are to be of great value to society. Students with these abnormalities or with previously unrecognized astigmatism need little instruction or encouragement to become advocates of medical supervision of school children.

The necessity of compulsory physical examination at registration is not always understood until a large percentage of those examined have been called for reexamination and advice concerning errors of refraction, carious teeth, flat feet, curvature of the spine, incorrect posture or other defects. Then the significance of the requirement becomes apparent, and students freely express their appreciation of the opportunity they have been given to ascertain their physical condition. Certification of physical health, as a prerequisite to entering athletics, and prescriptions for corrective gymnastics further emphasize the importance of physical examination. The establishment of a sympathetic attitude in the mind of the laity toward health measures is of the utmost importance, if public health is to attain its greatest advancement. While it is usually difficult to make those who think they are well show great interest in "how to keep well," the sick and defective are easily interested in the fundamental principles of corrective and preventive medicine.

Unhappily, certain students must learn that their defects make it necessary for them to revise their plans as to courses to be pursued in the classroom and

in physical education. Their misfortune will, to a considerable degree, be compensated if they carry over into life an appreciation of the relation of physical and mental adaptation to successful careers and to efficiency in occupation.

In physical examinations, the students are required to undergo anthropometric measurements, and the observation of a dentist, an aurist, an oculist, a laryngologist, a clinician and a surgeon. They must also submit a specimen for urinalysis. A number have revealed to them, for the first time, the meaning of specialization in medicine, a discovery of value both to medical practice and to public health.

The findings of the physical examinations of a large number of recent graduates of public schools serve as an index of the efficiency of the departments of physical education and of medical supervision. If the health services of institutions of higher learning will adopt a "follow-back" as well as a "follow-up" system in dealing with defects of registrants, they will be able to cooperate with the schools from which the students come, to mutual advantage. The examination of many young men and women will be of great help in making generalizations of public health value. The facts obtained in such instances and the careful following of the graduates should lead to interesting observations concerning the cause of the so-called degenerative diseases and the influence of occupation and habits in relation to them.

Physical examinations and the conferences following them afford opportunities to release minds from the thraldom of imaginary ailments, from the evil of misdirected sympathy and from the introspection and depression created by charlatanism and quackery. Advice, encouragement and mental prophylaxis lead to the establishment of the proper attitude of mind, which is essential to the prevention of subsequent burdens on family and society.

CONFERENCES

A health service encourages the student to seek information whenever he thinks his health requires it. While this policy brings in trifling injuries and slight ailments, it leads to the discovery of potential or incipient conditions that need attention. The community is better protected against communicable disease, and the student avoids illness and infected wounds.

Conferences afford an opportunity to view the stress and strain of modern education on the central nervous system under varying conditions. They reveal the handicap of bad habits of study and of the wrong types of recreation. They bring to the surface the blight of worry, the far-reaching effects of unhappiness and depressing environment on cerebral efficiency. They present a chance to demonstrate the potency of psychotherapy, the benefits to be derived from the proper mixture of work, play, and social intercourse. They emphasize the wholesomeness of optimism.

Frequently these conferences deal with subjects not immediately affecting the student's health. He may ask for some data in connection with a hospital in which his father is interested. He may want plans for a sanitary outhouse for his country home; references to some form of public health work on which he is writing a long theme, or a list of text books suitable for the high school students to whom he will teach hygiene next year.

Former students frequently write letters or call for information concerning some phase of hygiene and sanitation in which they are particularly interested. On the day this article was written, three letters arrived, one from a graduate in journalism, specializing in advertising, who requests data concerning tooth-paste. He wishes references to aid in adequately describing his product. A second asks for methods of destroying mosquitoes; while the third wishes to borrow a set of slides on "school sanitation."

In many of these conferences, questions often arise which involve medical tradition or touch on problems of medical practice. They offer an opportunity to show the future community leaders that medicine is rapidly changing from an art to a science, based particularly on chemistry, physics and biology. Students must learn that results in medicine are not haphazard, but that cause and effect follow in logical sequence, as they do in experiments in the laboratory. There are still too many intelligent people who think medicine is a medley of tradition, mystery, long-sounding terms and personal opinions. In removing this false conception from the public mind, modern medicine has much to gain; nothing to lose.

EDUCATION

The great contribution of a health service to public health is the education of the student to appreciate the importance of hygiene and sanitation to himself and to his community. The mere introduction of an elementary course into the required curriculum of an institution of higher learning is not without significance to preventive medicine. Greater emphasis must be placed on the fact that dissemination of knowledge, essential to self-preservation, is the first duty of education.

What the universities and colleges should do in the teaching of hygiene depends largely on the amount and nature of the instruction given in the grade and high schools from which their students come. For the present, the equivalent of three hours a week for one semester would not indicate an undue emphasis on hygiene. The time might well be divided, two thirds to general, and one third to vocational hygiene; the former to be required of all students during their first semester after matriculation, and the latter to be taught later, in connection with their professional training. The instruction should be both didactic and practical, and ample opportunity should be given for the students to confer with their instructors and with members of the health service staff.

Members of the staff of the health service, in their daily contact with students, have an excellent opportunity to give practical significance to the didactic and laboratory instruction in courses allied to medicine. The student finds new interest in zoology or entomology when the relation of protozoa to dysentery or of insects to disease is discussed during a consultation for enteritis or malaria. The overlapping of the problems of sociology and medicine are particularly attractive to the man or woman studying social evolution, charities, population or criminology. The senior in the engineering school will exchange information with the sanitarian concerning the problems of Panama, the Rand or the Hudson Tunnel, with the keenest interest and to mutual benefit. Even the tyro in chemistry, wrestling with the mysteries of affinity, is not immune to a simple statement of the principles of chemotherapy.

The student's familiarity with the work of a health service has a high educational value. Members of its staff should see that the student learns that the waiters, dish-washers, cooks, dairymen and other food handlers employed by the university are examined physically, in order to exclude those with communicable diseases from handling food; and that they are vaccinated against smallpox and inoculated for typhoid fever, in order to protect the patrons of cafeterias from disease. In institutions in which a considerable amount of student help is used, this lesson becomes very practical. The requirements of the student officers' reserve corps and the advice of heads of departments of bacteriology and sanitary engineering that their students be vaccinated and inoculated further emphasize the importance of immunization.

A case of diphtheria properly handled in a fraternity house will do more to demonstrate the value of antitoxin, the use of the Schick test, the danger from carriers and the necessity for isolation than several hours of didactic instruction. It presents a demonstra-

tion whose significance remains throughout life. It creates a respect for quarantine and promotes a spirit of cooperation in the prevention of disease.

A health service greatly aids in the promotion of public welfare by the cultivation of an appreciative attitude toward hospitalization. Many of the most intelligent people have an unreasonable dread of hospitals, and use their facilities for diagnosis and treatment only as a last resort. When students are encouraged to go to the infirmary early and conditions are such that they cannot very well be cared for at their lodging houses when sick, hospital treatment is expected. It will mean much to public health to have our college graduates understand that they can obtain better care for themselves and for their families in a well-conducted hospital than at home. What will this mean to maternal and infant welfare, to diagnosis, to treatment and to the equipment and maintenance of hospitals?

SANITATION

Environment is the best laboratory for instruction in sanitation. By cooperation of the offices of the supervising architect, the superintendent of buildings and grounds and the health service, the necessary apparatus is provided for effective teaching. The care of the campus, the style of buildings and variation in equipment, with their age, their methods of ventilation, heating and temperature control, means for provision and determination of humidity, lighting system, types of drinking fountains, sanitary plumbing, regulations for the care of the swimming pool, etc., are mute instructors, demonstrating the present conception of sanitation, and its evolution during the last few decades.

If the school does not have dormitories, or they are so restricted as to require a large number of students to live in private lodging houses and to eat at such places as may be available, conditions arise that make a sanitary survey imperative. Lunch counters spring up in unexpected places and pie-wagons vie with one

another in seeking strategic locations with reference to student traffic. As many students are compelled to live as economically as possible, they must patronize the cheaper places. Proprietors of lodging and eating houses would show a lack of business ability if they did not give some attention to their financial returns.

This combination of circumstances converts the student district into a community health unit, with all of its problems in the prevention of disease and the maintenance of health. Here the health service operates, educating, creating public sentiment, encouraging and urging a demand for sanitary improvement. It cooperates with the local boards of health, with public-spirited citizens and with the students, in helping to bring about the living conditions that make the college community one of the most attractive in which to live. To interest a number of intelligent men and women in the sanitary improvement of their surroundings is to prepare them for better citizenship by their enlistment in the advancement of public health.

Today, departments of health must teach by lectures, exhibits, pamphlets and propaganda, in order to produce the necessary education of the laity to overcome the resistance of ignorance and of short-sighted cupidity to the widest application of well-established methods to the promotion of public health. They are compelled to give instruction that should be a part of the required courses of schools and colleges. Unless the acorn of sanitation is planted in the schools, it will be many years before the oak can be used by departments of health in the erection of magnificent edifices of community and national health, commensurate with scientific knowledge. In the sowing of the seed, a health service offers helpful cooperation with all organizations interested in the advancement of public health.

A student health service and a school of hygiene are complements. The first creates public sentiment and

obtains moral and financial support for public health work. The second trains experts for leadership and research. The former strives to permeate the masses with elementary science as used in the promotion of health; the latter to produce torch-bearers and pioneers in preventive medicine.

Is it too utopian to believe that the united efforts of the graduates of our institutions of higher learning, the staffs of departments of health, the faculties of the schools of hygiene, and the medical profession are able to bring into existence those living conditions which are the goal of preventive medicine—the essence of applied Christianity?

ABSTRACT OF DISCUSSION

Dr. John Sundwall, Ann Arbor, Mich.: The third who failed to pass the normal tests for physical fitness as revealed by the draft examinations, the 80 per cent. of our school-children who have defects that will make it difficult for them to make the proper social adjustments later on in life, the appalling number that must go onto the human scrap heap during that adult period of life when one should be enjoying to the maximum life and its various activities, and when one should be of the greatest economic and social value—these are responsible, in the very largest measure, for the tendency of public health interests and activities to concentrate more and more on personal fitness or physical efficiency as one of its chief objectives. No other institution offers better opportunities to develop this newer and broader conception of public health interests, health efficiency, than does the university. Each student must be instilled with a profound appreciation of what physical efficiency means to his success and happiness and his value to society. So saturated must the student become with the ideals and standards of health efficiency that he will feel that it is his moral, social and civil obligation to achieve and maintain a sound, active, vigorous, dextrous and harmoniously developed body. In order to reach this objective—an appreciation of, and a desire for positive health on the part of the student—health efficiency should be made one of the basic divisions of university work. The administrative officers and the faculty must become permeated with these ideals and standards. The chief health officer of the university should sit in all the councils of the university's administration. He should be given similar authority and dignity to that now ascribed to deans. Furthermore, the university should require of all its entrants evidences of health and

physical efficiency. The thoroughgoing physical examination should be required of all entering students prior to registration. These should be repeated annually. Personal fitness and efficiency should be made a requirement for participation in the active life of the university. The benefits, honors and awards of the university should be conditioned by the health and physical efficiency of the recipients. Students should not be graduated who, because of ignorance and neglect, have allowed their body machines to "run down." Assuredly the state is being cheated when the university underwrites physical defectives as capable of serving and directing society. Let us develop a university type of physique. It is precisely along these lines that the university can serve the public health movement best. The university has the opportunity and possesses the facilities to attain these physical efficiency ideals. Students later on in life become the leaders in their respective communities. Thus these ideals and standards of health will radiate out into society.

Dr. J. Howard Beard, Urbana, Ill.: I would like to emphasize what Dr. Sundwall has said, and to point out that a health service is an economic necessity.

LEGAL STATUS OF PHYSICIANS AND SECTARIANS

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Probably no subject has given rise to so much acrimonious discussion and bitterness of feeling as the efforts of physicians to restrict the practice of medicine to certain individuals or to certain classes. This problem is apparently no nearer permanent solution than it was fifty years ago. The proceedings of our state associations show that every year the adoption of a new medical practice act or of an amendment to the existing medical practice act is among the subjects discussed. At every session of the state legislature, bills creating new practice acts or amending existing laws, and special bills providing for the registration of osteopaths, chiropractors, naturopaths, drugless healers, mental healers and other fantastic sects occupy a considerable share of the session. There is no other subject on which the medical profession in the last thirty years has expended an equal amount of time and energy. Yet, in spite of all our efforts, there is not a single sect or cult, no matter how absurd or fantastic, which has failed ultimately to secure the so-called legal recognition which it sought, in spite of any objection which the organized medical profession might present. Two explanations are usually given for the failure on the part of physicians to prevent the passage of such measures. These are lack of understanding on the part of the public, and indifference and lethargy on the part of the medical profession.

In spite of all our efforts, this question today occupies as large an amount of time and absorbs as much energy as it did twenty-five years ago. That it has not

as yet been satisfactorily solved is generally admitted. That its discussion is hampered by our own prejudice is also true. Rarely, if ever, is this question discussed in professional circles with the thoroughness, the absence of personal feeling and the readiness to accept a recognized truth from any source which characterizes our discussions of the scientific questions of medicine. This is largely because, whatever may be our lack of prejudice on other questions, on this subject we are ourselves sectarians and partisans. Yet its practical importance cannot be denied. It is not a scientific question, but an administrative and social question of importance, not only to physicians, but also to the public. Is it not, therefore, worth while for us to consider it, not in the light of our personal and professional prejudice, but rather as an abstract problem, a permanent solution of which would render unnecessary any further waste of time in the needless and profitless efforts of the past? Is it not possible that both the indifference of the public and the lethargy of the profession may be entirely justified, that the conventionally accepted attitude of the medical profession on this subject for the last forty years may be based on erroneous premises and inaccurate reasoning, and that, instead of endeavoring to educate the public to our point of view, we might rather attempt to learn something from the public point of view?

LEGAL REGULATION

The history of the efforts to restrict the treatment of the sick to certain individuals goes far back into the past. In a primitive civilization or in a simply organized state of society, no restrictions on professions or occupations are necessary. Each individual does what he is able to do for his own benefit or for the benefit of others, without any hindrance. It is only when society has become relatively complex that regulations for the government of various trades, industries, occupations and professions become neces-

sary. There is, consequently, nothing inherently wrong in any individual pursuing any occupation or profession which he may see fit. As society increases in complexity, regulation of many human activities becomes necessary. The violation of such regulations does not constitute inherent crime, as does murder, stealing or various other acts which are in themselves criminal.

The regulation of professions, occupations and trades, legally speaking, comes under what is known as the police power of the state, characteristics of which are that it aims directly to secure and promote public welfare, and that it does so by restraint and compulsion. Under the police power of the state comes a vast multitude of subjects which increase as society becomes more complex. Everything having to do with licenses, reports, registration, prohibition, commerce, safety, public health, public order and comfort, public morals, the regulation of capital, public corporations and property comes under the police power of the state. The only object and the only justification for the exercise of police power is the greatest good to the greatest number, or, more concisely, the general good. Acts which are regulated by police power are, in the majority of cases, acts which in themselves are not culpable and which are wrong only in a statutory sense; that is, because it has been found best for the public good to provide certain regulations for such acts.

Legally speaking, the regulation of the practice of medicine comes under the same classification as the regulation of any other occupation, profession or trade or of any other subject which must be regulated or restricted for the public good. Regardless of the provisions or limitations which may be made, the practice of medicine without a license is never a crime, but only a misdemeanor. It is in the same class as running an automobile or keeping a dog without a license, exceeding the speed limit, permiting a factory chimney to

smoke, or violating any other of the thousand and one restrictions and regulations which modern society has evolved for its own protection.

Without attempting to discuss the history of medical practice acts in this or other countries, all of which I have considered at length in a previous article, it is interesting to note that the present system originated with Dr. N. S. Davis in the early seventies. In the hope of elevating the standard of medical education, Dr. Davis urged the creations of boards of examiners to pass on the qualifications of applicants, entirely separate from the medical faculty which had given the instruction to the student. In other words, as Dr. Davis put it, there should be a complete separation between the educating and the licensing bodies. His demands, which can be found in the proceedings of the American Medical Association from 1867 to 1873, were for the creation of a board of examiners by the state for the examining and licensing of medical college graduates. As a result of his agitation, Texas in 1873, Kentucky and New York in 1874, New Hampshire in 1875, and California and Vermont in 1876, passed laws creating such boards. During the next twenty years, every other state passed some kind of a law on this subject, so that by 1895 there was in practically every state a board created by special enactment charged with the duty of examining and licensing physicians and surgeons.

While differing considerably in details, practically all of these laws are based on the same principles and have the same general characteristics. They have been enacted almost entirely through the influence and at the demand of the regular medical profession. To discuss the numerous laws which have been enacted in the last forty-nine years is impossible. In no state is the original practice act still in force. In each state there has been a succession of laws and amendments enacted making changes from time to time. In the forty-eight states more than 250 separate laws on

this subject have been adopted during this period. In 1907, I abstracted and published in the *American Medical Association Bulletin* all of the medical practice acts then in force, and endeavored to summarize the average law on the subject. The synopsis, which I designated as a composite picture of medical legislation at that time, is equally applicable today, as the general character of these laws has changed but little during the last fifteen years.

No sooner were these medical practice laws enacted than there arose many cases which had to be settled by the courts. These involved prosecution of individuals accused of practicing medicine without a license, efforts by the board to revoke licenses once granted or demands, on the part of persons denied licenses, for a review of their cases by the courts, and the securing of what they considered to be their rights. It is significant that in the ninety years from 1780 to 1870, there had been only twenty-eight decisions in this field in all states, while, in the fifty-two years since 1870, there have been more than 800 cases passed on by supreme courts. In the early seventies, the suits involved mainly the rights of homeopaths and eclectics to practice medicine and to be represented on the examining boards. The appearance of the osteopaths in the late eighties caused a large amount of litigation and the rendering of many decisions, just as did the advent of the chiropractors later on. Each new sect as it appeared aroused opposition, prosecution and appeals to the higher courts, with the final rendering of decisions which established the legal status of the sect or cult, whatever it might be.

COURT DECISIONS

To discuss these eight hundred supreme court decisions in detail is impossible. In 1915, the Council on Health and Public Instruction published a digest of supreme court decisions on the state regulation of the practice of medicine, up to that date. In this digest

these decisions were abstracted, indexed, analyzed and summarized. The decisions which have been rendered since that time are in the main simply confirmatory of the previous decisions, and do not in any sense alter the principles laid down.

The final decisions of the courts of last resort are recognized as final authority on any legal question. What are the conclusions which can be drawn from the opinions of the various supreme courts on this subject?

They hold that the sole justification for the enactment of medical practice acts is the protection of the public from incompetent and unscrupulous persons; that the state has a right to enact laws making any reasonable standards for the practice of medicine; that the object of such laws is not the benefit of the physician, but the protection of the public; that it is not the function of the state, through either its legislature or its courts, to decide scientific questions or to determine the scientific value of one school or method of practice as compared with another, or to decide the relative value of different forms of treatment; that the sole interest of the state in the practice of medicine is the regulation of medicine as a business; that the legislature is justified, for the public good, in establishing and enforcing reasonable regulations under which such business may be carried on; that the qualifications and conditions exacted must be reasonable and equitable and must be the same for all those who desire the same privileges, and that the function of examining boards is to test the qualifications and knowledge of applicants in order to determine whether they may be properly entrusted with the treatment of the sick.

MEDICAL PRACTICE ACTS

The accumulated experience of the medical profession on this question in the different states for the last fifty years, and the history of the various experiments that have been tried, and of the attitude of the public,

the courts and the legislatures, forms an interesting chapter in the history of applied medicine. To discuss them in detail, under present limitations, is impossible. Summing up the situation, we find that after years of effort and experiment, the essential problem is no nearer solution than it was in the beginning.

Each state has on its statute books a medical practice act, which has been secured at great expense of time and labor on the part of physicians. It is in constant need of defense; it is not effective in accomplishing the purpose for which it was enacted; it is not understood or supported by the public for whose protection it was passed; it is of no special value to physicians because it handicaps the honest practitioner, but does not deter the faker or the charlatan, and it does not prevent any new sect, which may arise, from overriding its provisions. The public, feeling that such laws are for the benefit of physicians, is not and never has been especially interested in their enforcement.

By our insistence on the passage of these laws and through keeping their administration in our own hands, we have strengthened and confirmed this public misconception. As a result, we now have a cumbersome and ineffective machinery, supported largely at the expense of physicians, which has to be defended continually against assault, which occupies a large part of our time and energy, which might better be devoted to better purposes, keeps us in a false position before the public and arouses and keeps alive antagonism against the medical profession. The present laws do not accomplish the purpose for which they were created, and the efforts to adopt and administer them have in many states dragged the medical profession into politics and have prostituted our scientific organizations without any compensatory benefit to us or to the public.

Is it necessary to pursue this indictment further? Let us look at the question from an outside point of

view and apply it to some other class. Suppose that the owners of automobiles should appear each year before legislatures, asking for the passage of laws restricting the use of automobiles to certain individuals; that they should insist that the membership of all boards and the appointment of all administrative officers in carrying out these regulations should be controlled by automobile owners, and that only those persons who owned a certain kind of automobile should be permitted to have a license. Can you imagine the shout of derision that would go up from the people of the state at such a request? Yet this proposition is identical with the method now existing for the regulation of the practice of medicine.

LICENSES

It seems impossible to disabuse the minds of physicians, who have grown up under the present licensing system, of the idea that a license is an official endorsement by the state of a system of treatment. Evidently, the followers of the various sects have the same idea, since they present bills before legislatures asking for special boards of examiners and special standards of education and qualifications on the plea that they want recognition from the state—as though the legislature were a jury qualified to pass on scientific questions, and the passage of a bill creating a board of examiners for one sect or another amounted to a certificate of merit or an endorsement of the methods followed. Such a conception shows a complete misunderstanding of the legal character of medical practice acts. A license to practice medicine is not a recognition of anything. It is simply a permit to do something. Legally, it is exactly in the same class as a license to run an automobile or to own a dog. No one would claim that an automobile license constituted a recognition of an Overland, a Pierce-Arrow or a Ford as being any better than any other machine on the market. Certainly

no intelligent person would claim that a dog license was an endorsement or a recognition of an Airedale, a Boston bull or a collie. They are all of them simply permits by the state to do something which the state has restricted for the public good. A license to treat the sick is simply a permit from the state to carry on a certain business which has been by statute restricted to those holding such licenses. The license is evidence of the fact that they have complied with certain restrictions which the state, for the public good, has seen fit to require.

It is, of course, obvious that if there were only a single school of medicine and a single class of practitioners, there would be no difficulty regarding licenses. The problem of sectarianism is, therefore, inseparably involved in the discussion of the regulation of the practice of medicine. It is characteristic of each generation of physicians to regard the sects and cults of their own day as the only ones that have ever existed. To the physician of today, especially the man under middle age, homeopathy and eclecticism are simply names. Osteopathy is something that has existed throughout his entire professional activity. Chiropractic, as the newest, the most absurd of the many sects in medicine, is the only one which arouses the antagonism of the present generation of physicians. Yet history shows that sects of various kinds have been a constant accompaniment of the medical profession.

CHARACTARISTICS OF SECTS

When the characteristics of all the sects in medical history are tabulated, it will be seen that they follow a surprisingly uniform course. Practically every medical sect, like every religious sect, arises through the peculiar teachings of some individual, who bases a new and strange system of healing on his own fantastic ideas, rather than on the accumulated knowledge, experience and wisdom of the human race. Without going

back of the last hundred years, it is only necessary to mention Samuel Hahnemann as the founder of homeopathy, William Thompson in eclecticism, Mrs. Eddy as the high priestess of Christian science, Andrew Still as the originator of osteopathy, and Palmer, the magnetic healer of Davenport, Iowa, who invented chiropractic.

A second characteristic of sectarianism is that each cult starts with a small group of enthusiastic followers, personal disciples of the leader, who throw themselves into the propaganda with all the enthusiasm of religious fanatics. The parallelism between medical and religious sectarianism is indeed very marked. This group of followers grows first through personal contact and later through various methods of promotion.

The third peculiarity is that each sect evolves some new and fantastic theory regarding the cause of disease. Samuel Hahnemann taught that all disease was caused by the itch; Mrs. Eddy found the explanation for all mortal ills in mortal mind; Still taught that the human body was a machine and that all afflictions were due to the dislocation of some part; Palmer went Still one better and taught that all abnormal conditions of the body were due to the dislocation of one of the spinal vertebrae. It is worhty of note in this connection that all of these sects personify disease and regard it as an entity, rather than as any one of a great variety of abnormal conditions; that they all seek to attribute disease to a single cause, and to remove it by applying a single method of treatment.

A fourth peculiarity, common to all medical sects, is that they have a regular order of development and decay. Starting originally with the leader, who is regarded as inspired, the first generation of followers accepts the new method of treatment as a solution of all human ills. Later on, they recognize the limitations of their method and learn by practical experience that there are many conditions to which their methods are

not applicable. As time goes on, their teachings are modified by force of circumstances and by contact with the practical world. They gradually drop their fantastic notions; recognize the limitations of their methods; profit by the general knowledge of the medical profession and, in time, lose their distinctive characteristics and merge themselves in the great mass of physicians. This has happened in our own day with the homeopaths and the eclectics. Osteopathic schools are now offering courses in minor surgery, obstetrics and, in some cases, general surgery. In ten or fifteen years from now, it is safe to say that such osteopathic schools as still exist will be giving the best courses they can offer on diagnosis and treatment and, in the next twenty-five years, osteopathy will have become a name without any meaning—just as homeopathy and eclecticism have today.

This, again, is in line with religious sectarianism, which, like medical sectarianism, originates in an individual, is promoted by his immediate disciples, starts out to conquer the world, and eventually settles down into one of the innumerable sects of Christendom. Ask the average Presbyterian who John Calvin was and what the seven points of his theology were, and he couldn't tell you, to save his soul from perdition, even if he knows he is one of the elect. How many Episcopalians know why their church separated from the Church of Rome? How many Methodists can tell you anything definite about John and Charles Wesley, or how many Baptists know why they believe in immersion rather than sprinkling? Twenty-five years from now the Christian science church will be indistinguishable from other orthodox churches. Mrs. Eddy, before her death, recognized the limitations of her own teachings, and advised her followers to consult surgeons in cases of broken bones. The mother church at Boston long since instructed its healers to comply with state and municipal regulations regarding

infectious diseases. Christian scientists go to dentists for defective teeth and to oculists for errors of refraction. To expect the followers of either religious or medical sects to be consistent or logical is to expect the impossible. If these people had consistent or logical minds, they would not be sectarians.

THE QUESTION OF PATERNALISM

One of the principal reasons for antagonism to medical practice acts has been the opposition of the followers of these various cults and sects, who felt that their liberty was being interfered with by the enactment and enforcement of medical practice acts. This has given rise to various local movements and, at the time of the agitation for the passage of the Owen Bill in Congress—from 1910 to 1914—gave rise to a national movement known as the National League for Medical Freedom. As is usually the case in sectarian controversies, both the knowledge and the methods of these agitators were open to criticism. At the same time, it cannot be denied that there is a certain amount of justice in their position. Huxley, many years ago, when the British medical practice act was under consideration, stated clearly that it was not desirable for the state to attempt to substitiute restrictive legislation for individual judgment on questions relating solely to individual rights, and that it was better, in the long run, for each person to be responsible for his own well-being and to be free from any paternalistic supervision by the state. The courts have recognized in all their decisions that there are three classes who are entitled to special protection. These are, first, the child who is below the age of intelligent judgment and is, in the eyes of the law, an infant and a ward of the state, and as such is entitled to protection. This principle was emphasized by the supreme court of New Jersey in the celebrated case in which the parent, who was a Christian scientist, was brought before the court for per-

mitting his child to die from diphtheria on account of the parent's disbelief in antitoxin. The court, while recognizing the right of the parent to his own belief, denied the right of the parent to sacrifice the child, whose life might have been saved by recognized scientific methods.

The second class entitled to special protection consists of those who, through lack of mental development or through mental affliction, are incapable of exercising sound judgment. The insane and the feebleminded, like the child, are wards of the state and are, as the courts have repeatedly held, entitled to the best care available scientific knowledge can give them.

The third class subject to special consideration, not on its own account, but for the public good, consists of those persons suffering from communicable diseases which may be a source of infection to others. Here the public good demands that they be given such care and treatment as will render them harmless to the community, and this can, if necessary, be carried even to the restriction of their liberty.

But, with the exception of the child, the insane person and the person suffering from a disease dangerous to others, any sane adult who has a bodily affliction which is not a danger to others has a right to control his own body and to take such treatment or refuse such treatment as he may see fit. If he wishes to consult an osteopath, a chiropractor, a Christian scientist, a voodoo doctor, a witch doctor or a pow-wow doctor; if he wishes to treat his rheumatism by carrying a horse-chestnut or a potato in his pocket; if he prefers incantations to scientific treatment; if he likes prayers better than powders, or if he wants charms rather than surgery, he has a perfect right to do as he sees fit, and the state has no right to compel him to submit his body to any treatment that he does not desire. If he errs through ignorance, he must suffer the effects of his own poor judgment, just as he would

in any other activity in life. Physicians must recognize this right on the part of the layman, just as they assert their own right to individual judgment on other questions.

BASIS OF INTELLIGENT AND EQUITABLE REGULATION

Does this mean, then, that there should be no regulation of physicians or sectarians? By no means. Undoubtedly, there should be intelligent and equitable regulation by the state for the public good. What, then, is the remedy for the present absurd and unsatisfactory situation? It is for the medical profession to surrender to the public a function and a responsibility which it never should have assumed. If the people, for their own protection, desire to impose certain restrictions on those who wish to treat the sick as a profession for compensation, then it is the business of the public to determine the conditions and administer the machinery by which such regulation shall be carried out. Whether an individual is qualified to treat the sick is an educational and not a sectarian question. Its enforcement should be in the hands, not of physicians, but of the educational authorities of the state.

Having complied with the requirements of the state, which should be as high as they can be made, consistent with the public welfare, and having received a license, each person so licensed should be at liberty to follow any method of treatment or school of practice which he may see fit, subject only to the common law limitations on professional responsibility. Any physician who undertakes to treat the sick is subject, under the common law, to definite liabilities for the character of his treatment and of his services. But there should be one standard for all, and the task of defending such laws and elevating the standard belongs to the public and not to physicians. If the rights of physicians are invaded, then we can go before legislative bodies and frankly and openly fight for our

own interests. If the requirements are unfair or unreasonable in any way, then physicians can, with perfect consistency and with a clear conscience, appear before legislative committees and insist that reasonable provisions be adopted. But the protection of the public belongs to the public itself, and it can be safe in no other hands.

It is difficult to understand when or how the fiction arose that the medical profession is a divinely authorized and chosen class, charged with the protection of the public health and public welfare, even against the desires and the wishes of the people themselves. Such a doctrine savors far too much of imperialism to be particularly popular at the present day. Abraham Lincoln was emphatically right when he said he did not believe any man was good enough to govern any other man against his will. I do not believe that any man or any class of men is good enough or wise enough to be charged with the responsibility of protecting the people without their consent. We have in the last fifty years been assuming a burden which did not belong to us. To this extent we have pauperized the people by depriving them of their own responsibility. The sooner this responsibility is returned to the people, where it belongs, the better it will be for the public and the medical profession.

Recognition of these principles has been slowly growing in the last fifteen years. In New York, the regulation of all occupations, professions and trades is under the jurisdiction of the board of regents of the state university. In 1911, Tennessee provided for a board of three educators as a board of preliminary examiners. But there was no general recognition of the duty of the state to regulate professions and trades through a definite department of the state government until 1916, when Illinois adopted what is known as the Illinois Code, creating as one of nine departments of the state government a department of registration and

education with an educator at the head, which was authorized to examine and license physicians, surgeons, dentists, pharmacists, nurses, embalmers, optometrists, barbers, midwives, architects and structural engineers. Included in this list, by inference, was the entire group of so-called drugless healers. Nebraska and Idaho have adopted similar laws. The Illinois law today stands as the most complete and logical method for the solution of this vexing problem that has as yet been found. I would commend a careful study of the Illinois Code to all those interested in this question.

CONCLUSIONS

Summarizing the discussion of this subject, we are led to the following conclusions:

1. The regulation of those desiring to treat the sick should be based on educational rather than sectarian standards. Such regulation should be administered by the state educational authorities. For economical and efficient administration, the regulation of all professions, occupations and trades supervised by the state government should be placed in the hands of a single state department, which should have as its head an educator of recognized standing and demonstrated executive ability. This department should have the power to appoint examining and advisory committees for each of the different groups, the general educational standards being under the control of the department, which should also control the actual granting of licenses, as well as prosecutions for violations of the law. In the smaller states, in which the creation of a distinct department of the state government would be difficult, for practical reasons, a board of examination and registration, consisting of three educators of recognized standing with power to appoint examining committees for the different occupation, professions, schools, etc., will best meet the local needs.

2. Whatever machinery for regulation is adopted, it should be recognized that the object for such regulation

is the protection of the public, and that the people should pay for this protection as they pay for protection from any other danger. Such laws are emphatically not intended for the restriction of competition among practitioners. It is no more the business of the state to protect a physician against competition than it is to protect a drygoods man, a furniture dealer or a grocer. The only justification for restricting the liberty of any person is the public good. It follows, therefore, that the public should pay for this protection. Any scheme whereby a department or bureau of registration and examination is supported by fees is unfair, in that it places the expense of maintaining such a bureau on those who are restricted for the public good. Fees should be fixed at a nominal figure. All fees received for examinations or licenses should be turned into the state treasury, and all expenses of administering the laws and prosecuting violators should be paid out of the state funds by regular appropriations. Under the present system, in most states physicians are not only unfairly and unjustly restricted, but they are also compelled to pay the cost of their own restriction for the public good, a plan that is manifestly unfair and which should be abolished at the earliest possible moment. The people should pay for their own protection, and they should understand that they are paying for it and that they are entitled to it.

3. A third principle on which the medical profession should insist is that all persons desiring the same privileges should be required to comply with the same educational standards, without regard to the school from which they graduated or the sect to which they belong. Special sectarian standards are simply a back door to the medical profession, by which the sectarian endeavors to secure equal privileges at a lower cost. The moment equal educational qualifications are insisted on, sectarianism will be wiped out, since no one will elect a limited license as a sectarian if, for the same

price in time and money, he can secure an unlimited license as a physician. In application, however, the converse of this proposition must also be recognized; namely, that all persons complying with the same standards are entitled to the same privileges. If the osteopath, the chiropractor or the drugless healer desires to perform all the functions of a physician, he should be required to possess exactly the same qualifications and comply with the same standards, but, having complied with such standards, he should then be allowed the same privileges.

It is not anticipated or claimed that the recognition of these principles or the adoption of the method best exemplified by the Illinois plan will result in a medical millennium, any more than the adoption of any other single law. This discussion is presented in the hope that it will, to some extent, throw light on this perplexing situation and will enable those physicians who are interested in better social and professional conditions to secure more satisfactory laws, to profit by the experiences and mistakes of the past, thus relieving the medical profession of the embarrassment and confusion in the public mind under which it has labored for half a century, and, especially, that it will enable physicians, in the future, to conserve their strength and energies for professional and public activities, rather than to dissipate them in the useless and unproductive wrangling of the last half century.

ABSTRACT OF DISCUSSION

Dr. William C. Woodward, Chicago: Much of what has been said is based, it seems to me, on a misapprehension of the status of medical licensing boards. Such a board is not an agency of the medical profession, even though it is made up of physicians. It is an agency of the state, to carry out the will of the people as expressed by the legislature. It owes no duty to the medical profession that it does not owe to every one else in the community, and the medical profession has no right to command or direct its activities. The fact that the people entrust the work of such a board to medical men does not alter its nature or make the medical

profession in any way responsible for it. Granted that the legislation enacted to regulate the practice of medicine has been unwise. Many laws we have passed have not represented the acme of wisdom. Are we to repeal them all? Why single out medical practice acts? Possibly we have not yet exhausted our wisdom with respect to medical practice acts, and possibly observation and reflection may invest us with new wisdom. The situation may not yet be so bad as to justify us in saying that the public—the state—is powerless to assist the individual in his efforts to protect himself and his family against medical quackery and fraud. The public has too substantial moral and legal interests in the work of the physician to permit the abandoning of efforts to regulate his qualifications. No one else has so good an opportunity as the physician for executing crimes and then concealing them, and for concealing the crimes of others—blackmail, abortion, the illegal prescribing of narcotics and of alcohol, fraudulent certification of births, stillbirths, illness, injury, insanity, and even of death—the doing or the concealing even of murder. And to suggest that we as physicians abandon our efforts to assist the people in formulating and maintaining proper legal standards for the protection of the public and for the good name of our profession will not appeal, I hope, to the medical profession as rational or even humane. Let down the bars if you will, and who in the coming generations will enter the medical profession? We as physicians are none the less citizens. Our professional relations give us better opportunities than have other citizens to see the danger in medical quackery and to point out how to avert that danger. If we neglect to do so, we shall fail in our duty to our fellow man.

Dr. D. B. McEachern, Chicago: I was very much interested in Dr. Green's discussion, but being of a more philosophical turn of mind, I should like to go back and trace the thing that was responsible for this condition other than the local aspects. Originally the priests of the temples of Aesculapius were the healers of the sick. The priests themselves were responsible for a great deal of the mysterious attitude toward the treatment of disease. Up to a very short time ago, physicians adopted a mysterious attitude in handling people who were ill. I might say, without attempting to antagonize religion, that the close relationship between religion and medicine is responsible for the present outcrop of sectarian medicine. This close relationship has broken down as the people have become rationalized. What is necessary is a comprehensive education of the public and the general practitioner as well, to develop what Zenker calls physiologic thinking. I remember an observation made by the late Dr. Oscar King that strikes me as the basis of it all, which is education. He said, "If you substituted in the teaching of all public schools some of the fundamental sciences, such as biology, John Alexander Dowie would have

a hard time to make a living." The thing to do is to start in the public schools and educate the children.

Dr. B. C. Darling, New York: What Dr. Green has said is very true. It has always been hard for me to understand how these cults and sects got their start. They did this because there was no automatic provision for enforcement of the medical practice act. I am interested in the matter on account of the violation of the medical practice act, as radiologists, by roentgen-ray technicians and commercial roentgen-ray laboratories. In New York City the board of health has lately passed an amendment to the sanitary code in which it proposes to issue permits only to those properly prepared to handle roentgen-ray apparatus, and who are duly licensed physicians or dentists. The machines are becoming so powerful that following an improper treatment or diagnostic exposure, burns are more frequent and more severe. Law suits are so common that many insurance companies will not carry the liability insurance, in which case the layman technician or the commercial laboratories are neither professionally nor financially responsible. In such cases the referring physician may become liable to suit for malpractice on account of a burn or diagnostic error. The operator must know enough to protect himself and must know enough to protect the patient and the people living above and below. It is proposed to issue permits only to those qualified to practice medicine or dentistry, and they will be permitted to do only what they ask in the permit; if they ask a permit to do fluoroscopy, that is all they can do. A board of consultants has been established which will work with the board of health. New York State has passed a law making it automatic for the board of regents to cooperate with the attorney-general against irregular practitioners. Besides this, we should have annual registration, as recommended by Dr. Augustus S. Downing of the board of regents. It is the duty of the public rather than of the medical profession to see that their laws are enforced and their interest should be solicited. While we have had medical practice acts, the public has had only a false security and protection, for the act is never enforced.

Dr. Frederick R. Green, Chicago: I did not say that the present method of regulating the practice of medicine is illegal, but that our present laws are not doing what they were intended to do. There never has been any sect, no matter how absurd or ridiculous, that sooner or later has not been able to get so-called legal recognition and authority to do what sectarians all want to do, viz., to treat patients for a fee. So long as the public and the legislatures regard these laws as purely for the benefit of physicians, sectarianism can never be controlled. Laws which are not backed up by public sentiment never amount to anything. I should like to tell you how the question has been worked out in Illinois,

where a department of registration and education has been established whose function it is to regulate all occupations, professions and trades which the state restricts. There is, of course, no question as to the right of the legislature to create a board made up of physicians and, when appointed, they are acting as individual citizens and not as physicians. In the last forty-nine years the medical practice acts have not accomplished that for which they were intended, which is to exclude the unfit and admit those who are fit. The futile attempts to enforce those laws are putting us in a false position before the public and taking a large amount of time and money in each state to defend the medical practice laws. If the people want protection against undesirable men who practice medicine let them pay for it, just as they pay for police protection and protection against fire. Our efforts to enforce unsound laws put us in a false position before the public and prevent the proper appreciation of our efforts for the public good. Very few physicians take any interest in this question, yet it is of vital importance both to the profession and to the public.

TOXIN-ANTITOXIN IMMUNIZATION AGAINST DIPHTHERIA

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The development of antitoxin in the bodies of animals injected with diphtheria toxin is one of the best established of facts. Since von Behring and Roux announced the results of their investigations, large numbers of horses have been injected with toxin and have developed abundant antitoxin.

Unaltered diphtheria toxin has been used also as a stimulating injection in man, but it has to be used in very small and repeated doses; otherwise it would produce annoying local reactions and possibly even paralysis. It was early realized that if we ever attempted actively to immunize children, the advantage would be great if we could replace pure toxin with an altered toxin which would be equally effective and without danger.

USE OF TOXIN MODIFIED BY ANTITOXIN FOR ACTIVE IMMUNIZATION IN ANIMALS

The earliest knowledge that injections of toxin almost neutralized by antitoxin are capable of stimulating in animals the production of antitoxin came quite accidentally. As is well known, antitoxin can be detected and measured only by its characteristic of neutralizing toxin. The degree of neutralization of the toxin by the antitoxin is determined by the injection of a definite quantity of the mixture into guinea-pigs. The testing of the potency of the drawings of the serum from the various horses under treatment is likely to leave a certain proportion of the test animals alive because of their having received subcutaneously toxin with an overneutralizing amount of antitoxin. The attempt to use these treated guinea-pigs several

months later revealed the fact that many of the animals were immune. Investigation proved that this antitoxin immunity did not appreciably develop until the lapse of from four to six weeks.

Babes, in 1895, was the first to inject experimentally diphtheria toxin-antitoxin mixtures and to appreciate that not only slightly underneutralized diphtheria toxin, but also that which was slightly overneutralized, would cause the development of antitoxin in animals. A little later (1896), but independently, I made the same observations. Wernicke, in 1895, noted that guinea-pigs actively immunized by the injection of living bacilli and antitoxin gave birth to immune young, and that antitoxin was present in both the mothers and their offspring for at least eight months. In the winter of 1896, I began to use this knowledge concerning much overneutralized toxin practically, in starting the immunization of the horses which were employed for the production of diphtheria antitoxin.

I noted that the use of large amounts of overneutralized toxin was a safe and rapid method of beginning immunization. In the same year, Dreyer and Madsen made systematic investigations as to the effect of different degrees of overneutralization on the effectiveness of the toxin-antitoxin to stimulate antitoxin.

In 1903 I published results showing that an injection into a horse of 10,000 lethal doses of toxin which has been just neutralized usually causes the development of about 60 units of antitoxin per cubic centimeter of serum, while the same toxin neutralized sixfold usually causes the production of about three units.

In 1905, Theobald Smith studied the duration of immunity in guinea-pigs which had received toxin-antoxin. He corroborated the work of Wernicke, and extended to two years the time during which guinea-pigs retain immunity.

The fact that the antitoxin would take a number of weeks to develop in those not originally possessing it

made it not applicable to persons in immediate danger of infection. Therefore, in the presence of diphtheria, immunizing antitoxin injections would still be necessary in families and institutions. In the absence of any simple test for determining which individuals had natural antitoxin and which did not, we had to inject many unnecessarily, if active immunization were to be attempted. The success of the treatment would also be difficult to determine. These considerations delayed its application in man. On the other hand, we had the growing conviction that, wonderful as were the results of antitoxin, diphtheria could never be conquered by it. The combination of the ever present carrier of bacilli, and the slowness of people to recognize diphtheria when it develops, still permits the occurrence of 50 per cent. more diphtheria than we would otherwise have, and perhaps one sixth of the number of deaths. Furthermore, vital statistics revealed that diphtheria mortality and morbidity had not decreased during the last five years; for instance, in the state of New York, the mortality was 12.8 in 1917 and 16.8 in 1921. Only one means presented itself to our minds which gave any hope of making another distinct advance. This was active immunization by means of toxin injections.

In 1913, the application by Schick of the intracutaneous neutralization test to detect antitoxin immunity gave a simple means of testing for antitoxic immunity before and after the injections.

PRACTICAL APPLICATION OF DIPHTHERIA TOXIN-ANTITOXIN IN MAN

Von Behring, May 8, 1913, reported the injections of neutralized toxin in a small number of persons. Before giving the injections he used no Schick tests or other means of testing whether or not the cases were already immune. He demonstrated by repeated guinea-pig tests that there was a quick development of antitoxin in many of those treated, but in others no antitoxin was detected at the time the tests were made.

It is now known that the retests were made too soon to detect the development of antitoxin in those who had none at the time of the injections. The duration of the immunity was not investigated. Although von Behring referred to the toxin-antitoxin mixture as his discovery, what he used was exactly what several of us had described and used in experimental animal immunization during the last eighteen years. His real contribution was the demonstration in a few human beings of the safety of the injections.

The example of von Behring led Hahn and Summer shortly afterward to offer the toxin-antitoxin to the 4,300 children of six villages in the district of Magdeburg, where diphtheria was endemic. Of the 1,097 children injected, 633 received the full series of three injections; 255 received two injections, and 209 received one. The Schick test was not used before or after treatment, so it is impossible to know how many of the injected children possessed natural antitoxin and how many of the others developed it.

There was no difference in the development of cases of diphtheria among the treated and the untreated portion during the first two weeks following the completion of the injections; but after that time there was a lessening of the number in the treated portion. The immunization had no apparent effect on freeing carriers from infection. Until after the war, no further observations or immunizations were made in Europe.

Oct. 21, 1920, Bieber published his study of the histories of all the children mentioned above. Fortunately, he was able to trace the majority of those who were living in the district at the time of the injections. He reported that during the six years, 15 per cent. of those who had not received injections had had attacks of diphtheria; that only 4.6 per cent. of the total number inoculated, and only 3.3 per cent. of the fully treated had developed it. Because of the war, many of the diagnoses were not confirmed by cultures, and he believed that some of the cases were almost

surely not diphtheria. Two of the incompletely treated children had died from diphtheria.

Bieber concluded that although the toxin-antitoxin had not given a lasting immunity to all who had received the injections, the results were satisfactory in that the percentage of persons having diphtheria was very much less in the inoculated portion than in that uninoculated. He believed that the results should stimulate more extensive trials.

PERSONAL OBSERVATIONS

Before and since the period of the war, the practical value of the toxin-antitoxin injections was subjected to continuous investigation by workers in the Bureau of Laboratories of the Department of Health of the City of New York. The results obtained and the conclusions drawn are as follows:

THE ANTITOXIN RESPONSE AND THE PERMANENCE OF THE IMMUNITY ACQUIRED

Late in 1913 we began the practical use of toxin-antitoxin injections for the immunizing of children against diphtheria, and established the facts that the procedure was harmless and that after three injections about 80 per cent. of those individuals possessing no antitoxin or insufficient antitoxin to protect from diphtheria, developed immunity. Those showing positive Schick reactions and receiving two injections, developed negative Schick reactions in about 70 per cent.; those receiving one injection, in about 50 per cent. We soon realized that the most important problem was the duration of the antitoxic immunity in those that had developed antitoxin. A satisfactory answer to this question required that immunizations be carried out in institutions where the children would be under observation for a number of years. A few suitable institutions were immediately sought for and obtained by Dr. Abraham Zingher and, later, additional ones were added by Dr. M. C. Schroder. We have thus been able to keep under supervision for from three to six and one-half years some 10,000 children. From year to year, Drs. Zingher and Schroder have been reapplying the Schick test to these original children. With a few of them we are now in the seventh year of observation. We have had no serious immediate or late after-effects. In these institutions diphtheria has not developed in any child who has received three injections. Eighty per cent. of those who received three inoculations have developed sufficient antitoxin within three months to prevent the positive Schick reaction. Fifty per cent. of

the remainder developed antitoxic immunity sufficient to give the negative Schick test before the end of the first year. The remainder received then or later a second series of injections, and all of these concerning whom we have information became immune. In some later investigations, we have encountered occasional children who resisted even two series of injections.

TABLE 1.—RECORD OF PERSONS ORIGINALLY GIVING POSITIVE SCHICK REACTIONS, NOV. 16, 1915; INDIVIDUAL RESULTS FOR FIVE AND SIX YEARS AFTER THREE TOXIN-ANTITOXIN INJECTIONS GIVEN ON NOV. 20 AND 25, AND DEC. 3, 1915

Observation Child No.	Retests					
	Jan. 29, 1916	June 29, 1916	January, 1917	January, 1919	January, 1921	January, 1922
1	—	—	—	—	—	—
2	—	—	—	—	—	—
3	—	—	—	—	—	—
4	±	—	±	—	—	—
5	—	—	—	—	—	—
6	±	—	—	—	—	—
7–12	—	—	—	—	—	—
13*	—	±	—	±*	—	—
14	—	—	—	—	—	—
15	—	—	—	—	—	†
16	—	—	—	—	—	
17	—	—	—	—	—	
18	±	—	—	—	—	
19	±	—	—	—	—	
20*	±	—	±	±*	—	
21	±	—	—	—	—	
22–26	—	—	—	—	—	
27	+	—	±	—	—	
28	—	—	—	—	—	

* Given series of three injections.
† Fourteen of the twenty-eight present in 1921 had left.
± indicates a very faint Schick reaction; ±, a very moderate Schick reaction.

As an illustration of the methods used in retesting the children from year to year in the institutions, Table 1 is given. In it are entered the results of frequent Schick tests of twenty-eight children who, having given positive Schick tests, received immunizing injections and later gave negative reactions; these children remained in the institution and con-

tinued negative during five years. Of these, fourteen remained and continued negative for six years and ten continued negative for six and one-half years.

DISCUSSION OF RESULTS OF TESTS

Twenty-two became negative within two months, twenty-seven in seven months; twenty-five of these remained negative during the five years. One of the remaining became finally immune and two, Numbers 13 and 20, required a second series of injections in 1919.

In cases such as 13 and 20 it is impossible with our present knowledge to determine whether the difference in the degree of reaction is wholly due to a fluctuation in the amount of antitoxin present or whether the deviation from the negative is partly due to a variation in the strength of the toxin used in the Schick retest or to error in the placing of the supposedly intracutaneous injection.

The results in the twenty-eight children are representative of those obtained in the other institutions. With one or two exceptions among hundreds of children, all who did not respond to the first series of injections became negative to the Schick test after the second treatment. The 1916 and 1917 tests were done by Dr. Zingher, the latter one by Dr. Schroder.

As an example of the results following the injections in the schoolchildren, Table 2 is given.

The knowledge that about 80 per cent. of the children who possess no diphtheria antitoxin develop it after three injections of toxin-antitoxin and with very few exceptions retain

TABLE 2.—RESULTS OF ATTEMPTED IMMUNIZATION AS SHOWN BY SCHICK TEST THREE OR MORE MONTHS AFTER TREATMENT WITH THREE INJECTIONS OF TOXIN-ANTITOXIN; CHILDREN FROM PUBLIC SCHOOLS OF BROOKLYN; TESTS BY DR. SCHRODER

Number of School	Location	Total Number Children Retested	Positive Cases Which Became Immune	Per Cent.	Length of Period Between Treatment and Retest
158	Belmont Ave. near Warwick St.	370	254	68.7	3 mos.
156	Sutter Ave. near Barrett St.	329	292	88.8	3 mos.
173	Penn. Ave. near Liberty Ave.	163	144	88.9	4 mos.
29	Columbia and Amity Sts.	57	45	79.0	5 mos.
142	Henry and Rapelye Sts.	127	112	88.0	5 mos.
50	S. 3d St. and Driggs Ave.	82	74	90.3	6 mos.
16	Wilson Ave. near Bedford Ave.	241	216	89.7	6 mos.
72	New Lots Road	199	195	98.0	6 mos.
109	Dumont Ave. near Sackman St.	141	99	70.0	6 mos.
4	Berkeley Pl. near 5th Ave.	103	91	88.4	7 mos.
	Total	1,812	1,522	83.9	

it for at least six years, and that those who partially fail to respond do respond after a second series of treatments, affords us ground for the belief that we have a practical means of immunizing the child population of the country. Even though the belief that this change in the antitoxin content of these children is a permanent one should prove erroneous, it would merely mean that one would have to repeat the injections not oftener than once in six years.

PERMANENCE OF NEGATIVE SCHICK REACTION IN PERSONS WHO DEVELOP NATURAL IMMUNITY

At the Convent of St. Dominick, ninety-four of the original children who had given Schick negative reactions with Dr. Zingher's tests remained for five years. These children were retested at the two and five year periods by Dr. Schroder. In both retests ninety of these children showed negative reactions, while four showed positive reactions in one or the other retest. It is an interesting point as to whether the children who were negative originally had lost their antitoxin or whether the apparent change in reaction was due to other causes. We know from making the double Schick test (that is, one test on each arm) on several hundreds of children, that routine tests made even by an expert are likely to show occasional errors. In this test series, about 2 per cent. of the children showing positive tests had them only on one arm. There was, therefore, no doubt that in 2 per cent. of these children, one of the two injections had been inserted too deeply so that the toxin did not remain in the skin and therefore could not produce the reaction. We know also that slight differences in the strength of the toxin solution cause a borderland case to give either a negative or a positive reaction. Differences in technic and in toxin solution possibly account, therefore, for the apparent change in one or all of the four cases. On the other hand, we know that the amount of antitoxin in an individual changes somewhat from time to time, so that it is possible that one or all of the four cases might have reacted at one time and not at another to the standard Schick toxin properly given.

Whatever the explanation of the apparent change in four cases, we have the remarkable fact that nearly 96 per cent. of the originally negative children remained negative during five years. Practically the same results have been obtained in all the other institutions.

INFLUENCE OF AGE ON SUSCEPTIBILITY AND THE RESPONSE TO IMMUNIZING INJECTIONS

It is common belief that the mortality from diphtheria is greatest at the ages of from one-half year to 4 years, inclusive; that it then drops steadily until at 10 years it is quite low and so remains during the rest of life. The figures in Table 3 give evidence that this belief is founded on fact.

The greater liability to infection during the first years of life is clearly shown in the results from the Schick test. Our findings in New York City are given in Table 4.

All reports show that under similar conditions the highest percentage of persons having antitoxin occurs among infants passively carrying their mothers' antitoxin and among adults; between these ages there is first a decrease and then an increase. The same reports show that similar age groups of different children reveal surprising differences in the percentages of those possessing antitoxic immunity.

TABLE 3.—DEATHS FROM DIPHTHERIA GROUPED BY SEX AND AGES, CITY OF NEW YORK, YEAR 1917

Age	Males	Females	Total	Per Cent.
Under 1 year	73	60	133	11+
1 to 4 years inclusive	390	319	709	60+
Total under 5 years	463	379	842	72+
5 to 9 years inclusive	119	132	251	21+
10 to 14 years inclusive	9	13	22	2
15 to 19 years inclusive	6	4	10	1
20 to 24 years inclusive	2	8	10	1
25 to 60 years inclusive	9	14	23	2
Total all ages	608	550	1,158	

TABLE 4.—AVERAGE SUSCEPTIBILITY OF VARIOUS AGES TO DIPHTHERIA (AS INDICATED BY THE POSITIVE SCHICK DIPHTHERIA-TOXIN SKIN TEST), IN NEW YORK CITY *

Age	Schick + (Susceptible)
Under 3 months	15 per cent.
3 to 6 months	30 per cent.
6 months to 1 year	60 per cent.
1 to 2 years	60 per cent.
2 to 3 years	60 per cent.
3 to 5 years	40 per cent.
5 to 10 years	35 per cent.
10 to 20 years	25 per cent.
20 to 40 years	18 per cent.
Over 40 years	12 per cent.

* The percentage of positive reaction is considerably higher among those living in the country.

Table 5 notes the very small percentage of susceptibles in an institution caring for little children gathered from the poorest and most crowded homes of the city. Table 6 exhibits the surprising difference in the results obtained from tests of pupils in different parts of Brooklyn.

A minimum, an average and a maximum result from among the larger Brooklyn public schools subjected to the Schick test by Dr. Schroder or her assistants is given in Table 6. The ages ranged from 6 to 12 years.

The highest percentage of positive tests obtained by Dr. Schroder in any Brooklyn school was 72, and the lowest 16. These were in small schools. The average percentage of positives among 30,000 children in seventy-three Brooklyn schools was 41.5.

In the Manhattan schools at the same time or a little later, Dr. Zingher among 52,000 children found that the percentage of positives was 30. The highest percentage of positives in any school was 67, and the lowest, 13.6.

TABLE 5.—RESULTS OF THE SCHICK TEST IN AN INSTITUTION CARING FOR CHILDREN GATHERED FROM DENSELY POPULATED PORTIONS OF NEW YORK CITY

	Schick Reactions				
	Positive		Borderland	Negative	
Age	+	±	±	—	Per Cent. Positive
Under 5 years	6	2	0	35	18.5
5 to 10 years	21	2	8	220	9.0
10 to 15 years	5	2	4	79	7.7
	32	6	12	334	9.9

The sign ± indicates a trace of antitoxin.

TABLE 6.—DIFFERENT PERCENTAGES OF CHILDREN GIVING SCHICK-POSITIVE REACTIONS IN FOUR LARGE PUBLIC SCHOOLS

No. of Brooklyn School	Total Number of Tests	Per Cent. Positive
50	1,433	19.60
125	1,064	36.84
149	1,056	41.19
156	1,148	61.84

The results obtained by Dr. Schroder among adults are very interesting as showing a much older age group. Among 4,396 adult inmates in an insane asylum there were 633 positive reactions, a percentage of 16. At all ages between 20 and 50 years, the percentage was about the same, but above 50 years of age the positives dropped to 10. There were a good many persisting pseudoreactions which made it extremely difficult in some instances to decide between a pseudoreaction and a combined reaction. The patients responded to the toxin-antitoxin injections as well as younger people, except that they showed more local reaction.

IMMUNIZING EFFECT OF TOXIN-ANTITOXIN INJECTIONS IN INFANTS AT BIRTH AND DURING THE FIRST TWO YEARS OF LIFE

If it were possible to immunize young infants, this would be most desirable. In order to test this possibility, 2,000 infants were given full doses by Miss Denny on the third, eighth and eleventh days after birth. Most careful observations revealed absolutely no deleterious effects. At the end of a year, 100 of these infants were retested. Only 52 per cent. gave negative Schick reactions. Since untreated infants of this age give about the same result, it is evident that the combined effect of immature cells and the overneutralization

TABLE 7.—RESULTS OF TOXIN-ANTITOXIN INJECTIONS IN SCHICK-POSITIVE CHILDREN

Number of Infants	Age	Toxin-Antitoxin Injections	Lapsed Period at Time of Retest	Results of Schick Test
6	5 mos.	3	3-5 mos.	—
5	5 mos.	3	9 mos.	—
3	6 mos.	3	4 mos.	—
4	7 mos.	3	4-5 mos.	—
12	8 mos.	3	4-5 mos.	—
Total 30				

TABLE 8.—RESULTS OF TOXIN-ANTITOXIN INJECTIONS IN SCHICK-NEGATIVE INFANTS

Number of Infants	Age	Toxin-Antitoxin Injections	Lapsed Period at Time of Retest	Results of Schick Test
1	3 mos.	3	4 mos.	±
2	4 mos.	3	4 mos.	—
2	5 mos.	3	4 mos.	—
3	6 mos.	3	4 mos.	—
6	7 mos.	3	4 mos.	—
1	8 mos.	3	4 mos.	—
1	9 mos.	3	4 mos.	—
3	10 mos.	3	4 mos.	—
1	11 mos.	3	4 mos.	—
Total 20				

of the toxin-antitoxin present (because of the passive immunity derived from the mother) prevents any appreciable response at birth to the toxin-antitoxin injections. Infants aged 6 months and over gave far better results.

Thus Dr. Blum observed the results of the injections in a number of older infants, in the Home for Hebrew Infants. His figures are given in Tables 7 and 8.

Dr. Byard also reports very favorable results among children in private homes. Many of these were not given the Schick test before receiving the immunizing injections. It

is fair to assume that about 50 per cent. would have given negative Schick reactions. Of 286 such children, more than half of whom were under 1 year of age when injected, he noted that 143 (under 2 years of age when injected) when retested after seven months showed 136 negative, five positive and two very doubtful Schick reactions. Of the whole number, seven, or 2.4 per cent., when retested at the end of eight months were definitely positive. Eighteen months after the injections, 1.8 per cent. were positive. These results are certainly very encouraging.

These results of Blum and Byard among infants aged 4 months and over are of extreme practical importance, because from 6 months to 3 years is the period when immunization is most necessary and when it creates the least disturbance.

CONSTITUTIONAL AND LOCAL REACTIONS FOLLOWING THE TOXIN-ANTITOXIN INJECTIONS

Constitutional and local reactions following the toxin-antitoxin injections are negligible in the infant; slight and infrequent in the young child; moderate or rather severe in perhaps 10 per cent. of older children, and slight, moderate or quite severe in a large percentage of adults. The effects are largely due to the protein contents of the culture fluid and are not due to the toxin as such. This is evident because the same reaction follows the injection of the toxic broth rendered atoxic by heating, or of a solution containing a minute quantity of autolyzed diphtheria bacilli. If the toxin were the cause, there would be little or no reaction in naturally immune persons. As is well known, these show fully as much reaction as those who have no antitoxin, if not more reaction. Those individuals who give the strong pseudo-reactions with the heated or unheated toxin of the Schick test are those who give the most severe reactions with the toxin-antitoxin injections. However, some who give no pseudoreaction with the Schick test give moderately severe reactions to the toxin-antitoxin injections. The horse serum is present in such a minute amount as to cause no appreciable reaction except in a few extremely susceptible individuals. It does not seem to sensitize them appreciably to later doses of horse serum.

In children of school age about 10 per cent. develop fairly sore arms and temperatures of from 99 to 103 F. About 5 per cent. feel miserable enough to stay at home from school for one day, and a very few for two days. We have given about 40,000 inoculations this fall and winter without a single infection. Children that are constipated are advised to take a laxative on the day of the injection and to apply a moist dressing to the arm if swelling and soreness develop.

In adults, the reactions are not quite as severe as with the typhoid inoculations. The most severe reactions are restricted almost entirely to those who develop the marked pseudo-

reaction with the heated or overneutralized toxin. The following history gives an account of one of the most severe reactions that we have encountered:

A nurse at the Willard Parker Hospital was given toxin-antitoxin subcutaneously in the right arm, February 8. In the evening the arm in the region of the injection felt sore and looked red. The next day the soreness and tenderness were more marked. The highest temperature was 103 F. February 9, the patient was in bed. The temperature was 99. The right arm showed moderate redness of the lower two thirds, some induration and tenderness, and slight axillary tenderness. February 10, constitutional symptoms were absent. The temperature was normal. Redness and swelling persisted; induration was moderate; tenderness and pain were less marked; axillary tenderness was very slight. A Schick test and control which were made, February 9, both showed a moderate pseudoreaction, the two reactions appearing alike. Area of redness of about the size of a 25 cent piece, some induration present. Small secondary areola around central area of marked redness. The probability is great that the test was a pseudoreaction and not a combined reaction.

THE DEGREE OF IMMUNITY TO DIPHTHERIA INSURED BY A NEGATIVE SCHICK TEST

There is overwhelming indirect evidence which supports the view that under ordinary conditions sufficient antitoxin in the body to prevent the development of a positive Schick test will prevent the development of diphtheria. There can be no doubt that the injection of 500 units of antitoxin will give children an immunity for a period of at least twelve days and usually twenty days. (This is the period during which the Schick test remains negative when performed on such children.) The proof has been derived from its use in many outbreaks and in the exposed children of hundreds of thousands of families.

The recent statements by Havens that about 20 per cent. of diphtheria bacilli are of a different type from the one used to produce toxin for the immunization of horses, that the available monovalent antitoxin will not completely neutralize the toxin made by this other type and, therefore, that diphtheria may develop from infection with this other type in children showing negative Schick reactions to the standard toxin, have not been borne out by experience nor confirmed by us (Park and Williams) in experimental work.

The evidence that antitoxin is the only substance in the body that can prevent the toxin from acting is so conclusive that we can assume that a negative Schick test means the presence of sufficient antitoxin to neutralize it. The debatable points are: Is the minimum amount of antitoxin which is required to give a negative Schick reaction sufficient to

prevent absolutely the development of diphtheria; if not, is it sufficient to prevent a toxemia? Closely bound up with the answer to these questions is the degree of certainty that the general practitioner can assume that, as ordinarily carried out, a negative Schick test proves the presence of at least this minimum amount of antitoxin.

It is undoubtedly true that a certain number of persons who have given the negative Schick test have developed inflammatory conditions of the throat with positive cultures and that these have been diagnosed as moderate cases of diphtheria. In discussing such cases, it is wise at present to let each person make his own deductions. It is unquestionably true that a certain percentage of Schick tests are made in a faulty way. It is essential to have toxin of approximately the right strength for the test. Toxin of the proper strength when it leaves the laboratory may deteriorate quickly. In testing outfits sent from a number of biologic plants, Zingher found marked irregularity in the contents of some of them. In one case, two out of five outfits failed to give any positive Schick tests, even though the other outfits gave them regularly in the same children. We ourselves received by mistake a shipment of capillary tubes made of unsuitable glass. The toxin deteriorated rapidly when it was placed in these tubes.

Owing to imperfect technic or weak toxin, a certain number of persons are undoubtedly considered to have antitoxin when none is present. Such individuals are, of course, liable to diphtheria. Besides these, there are those in whom the Schick test is truly negative who have tonsillar exudate and positive cultures. These cases are comparatively few, and so far as I know are never characteristic of well developed diphtheria. It is possible, certainly, for a person to have virulent diphtheria bacilli and develop a throat inflammation from other bacteria. In such a case the positive culture shows the person to be merely a carrier. Even with a positive culture, a case can be considered as undoubted diphtheria only when the lesions are characteristic.

THE TOXIN-ANTITOXIN MIXTURE

The best mixture is one that is underneutralized and yet perfectly safe. As the mixture stands, the toxin deteriorates faster than the antitoxin, so that it gradually becomes neutralized and later overneutralized by the antitoxin. Therefore, a safe preparation is at its best when freshly prepared. As it would not be practicable to make new mixtures every day, we keep both the toxin and the antitoxin until they have become stabilized. After this has occurred, the toxin-antitoxin mixture changes very slowly. Even so, it is better not to use mixtures later than three months after their preparation unless animal tests prove them to be still slightly underneutralized.

It is noticeable that Preparation 24 gave much better immunizing than any of the others, except Preparation 18, which was a little inferior. The addition of 10 per cent. of the original amount of antitoxin to Preparation 24 lessened greatly its value. The other preparations had stood for some time, become less toxic and lost in immunizing power.

The comparative results of animal and human inoculations with different preparations show that very considerable differences in immunizing value exist. As yet we find it extremely difficult to determine by animal tests the finer differences which decide just when the ideal degree of neutralization is obtained. Dr. Banzhaf now standardizes our preparation so that 1 c.c. causes paralysis in the majority of

TABLE 9.—RESULTS OF INJECTION OF DIFFERENT PREPARATIONS OF TOXIN-ANTITOXIN IN GUINEA-PIGS

Preparation										
Number	Amt. in C.c.	Number Doses	Weeks Elapsed	Percentage of Neg. Schick Reactions	Number Doses	Weeks Elapsed	Percentage of Neg. Schick Reactions	Number Doses	Weeks Elapsed	Percentage of Neg. Schick Reactions
24	0.5	1	7	100	2	5	100	3	7	100
18	0.5	1	12	66	2	4	75	3	9	100
22	0.5	1	8	50	2	8	50	3	7	100
20	0.5	1	..	..	2	9	33	3	9	25
24A*	0.5	1	..	..	2	7	50	3	7	50
24	0.1	3	7	75	4	7	100			
18	0.1	3	10	50	4	9	60			
22	0.1	3	8	25	4	8	25			
20	0.1	3	8	0	4	8	40			
24A*	0.1	3	7	0	4	8	0			
10	0.1	3	8	0	4	8	0			

* Preparation 24 with an added 10 per cent. of its original amount of antitoxin.

guinea-pigs weighing 250 gm.; in all, 5 c.c. causes paralysis which ends in death. The results obtained in children and in animals with five different preparations clearly bring out the different degrees of success which are obtained with unequally neutralized preparations (Tables 9 and 10).

SAFETY OF TOXIN-ANTITOXIN INJECTIONS

In utilizing a substance which is a combination of a poison and an antipoison, it is of extreme importance to be certain that there is no possibility of a properly neutralized mixture becoming at some later period toxic. We have tested out many mixtures and kept them at all possible temperatures, and always found that the mixtures became very slowly more and more overneutralized. The antitoxin portion of the combination is more stable than the toxin. The only objection

to using products that have been kept a long time after neutralization is that they are somewhat less effective. The only accident that has occurred in the use of toxin-antitoxin mixtures, so far as is known, was due to an error through which an improperly tested product was sent out. The regulations now adopted by all biologic plants make a repetition of such an accident impossible.

PRACTICAL APPLICATION IN THE PUBLIC SCHOOLS

The health and school authorities determined to put their chief efforts for the first two years into an attempt to immunize as many schoolchildren as possible rather than to endeavor to protect the children of preschool age who needed the protection so much more. The reasons for this were many and important. It was deemed wise to acquaint as many parents and others as possible with the value of the Schick test and the toxin-antitoxin injections. No better

TABLE 10.—IMMUNIZING EFFICIENCY OF DIFFERENT MIXTURES OF TOXIN-ANTITOXIN IN CHILDREN

School or Institution	Mixture Three Doses 1 C.c. Each	Date Injected	Date Retested	Total Number of Children	Results +	Results —	Percentage of Positive Reactions
Colored Orphan Asylum.....	No. 18	12/ 5/19	3/ 1/20	70	3	67	95.7
Hebrew Sheltering and Guardian Home.....	No. 22	4/24/20	10/23/20	84	27	57	70.2
N. Y. Orphanage.	No. 22	6/ 5/20	10/23/20	63	35	28	44.4
P. S. No. 90.....	No. 24	12/17/20	5/ 3/21	160	20	140	87.5

way seemed available than to use the schools as the means of doing this. If each pupil presented his parents with a circular picturing the danger from diphtheria, describing the preventive treatment and asking for permission to administer this treatment if the family physician approved, it would mean that nearly a million adults, and a million children would have the arguments for the use of the toxin-antitoxin vaccine presented to them in a favorable way. If, as we hoped, about one half of the children brought back the acceptance of the offer to give them the toxin-antitoxin, we should be able not only to immunize those shown by the Schick test to possess no antitoxin but, by preventing those children from contracting diphtheria, we should also prevent their carrying diphtheria home to the younger children in their families.

The testing of the schoolchildren would also give us the chance to determine exactly what effect the immunization had had. We could make an index of 90,000 children who had been tested and, when Schick positive, had been injected with toxin-antitoxin; a similar index of 90,000 children of the same ages who had refused the test and the injections

could be used for comparison. The cases of diphtheria occurring among the children of school age could thus be looked up in either index, and observations made as to how many cases of diphtheria occurred in the two groups. We believed that after one or two years of such observations we should have had evidence of convincing value as to the protection guaranteed by a negative Schick test due either to natural antitoxic immunity or to the response to the toxin-anitoxin injections.

Now, at the end of two years, we actually have such an index completed. The 90,000 tested children and the 90,000 control children have been gathered about equally from the schools of the different boroughs; they were collected by the groups of nurses and teachers from the schools which

TABLE 11.—NUMBER OF CASES OF SUSPECTED DIPHTHERIA DEVELOPING IN 90,000 UNTREATED SCHOOLCHILDREN AND IN 90,000 TESTED BY SCHICK METHOD AND WHEN POSITIVE GIVEN TWO OR THREE INJECTIONS OF TOXIN-ANTITOXIN

	Cases Reported as Clinical Diphtheria
In Brooklyn:	
26,000 originally Schick-negative children (observation from October 1 to February 15)	2
15,000 Schick-positive children, 3, 2 or 1 toxin-antitoxin injections	4*
40,000 control children of same ages	27
In Manhattan:	
31,000 Schick-negative children (observation from October 1 to February 15)	3
19,000 Schick-positive choldren, 3, 2 or 1 injections	5
50,000 control children	29
Summary:	
57,000 Schick-negative children (observation from October 1 to February 15)	5
33,000 Schick-positive children injected with toxin-antitoxin	9
	9
Among a total of 90,000 Schick-negative or injected children	14
Among a total of 90,000 control children untreated	56

* Two of these children received but one injection and had no Schick retest. The third showed a Schick + and the fourth a Schick ± reaction on the retest and refused further injections.

had been tested by Dr. M. C. Schroder and Dr. Abraham Zingher. Among an equal number of untreated and treated children, there were four times as many cases among the untreated children. The majority of the cases in both groups were of slight or moderate severity. Some of them were possibly cases of nondiphtheritic tonsillitis in children who happened to be carriers of diphtheria bacilli. The methods which we have adopted in the diphtheria prevention work in the schools have already been published by Dr. Zingher (No. 96 of the Reprint Series, Department of Health, City of New York). I will describe them briefly.

A very important point is the enlistment of the interest of the principal of a school. As a rule Dr. I. H. Goldberger,

of the bureau of educational hygiene of the department of education, first prepares the way by obtaining permission for us to do the work in the school. According to the borough in which the school is situated, Dr. Zingher, Dr. Schroder or one of their representatives sees the principal and explains fully the objects we have in view. Literature is left for the teachers. Either the principal or the physician meets the teachers in a conference, gives them the necessary information, and tries to arouse their enthusiasm. The success or failure in getting a favorable response from the children or their parents depends largely on the interest which the principal, the assistant principal and the teachers take in the matter. When they give us their enthusiastic cooperation, we except to obtain consents from three fourths of the parents; when we fail to arouse the teachers' interest, we are fortunate if this is obtained from one fourth of them.

The preparatory work being furnished and the date for the test being determined, we send to the school the circulars and consent slips to be taken by the children to their homes.

Table 11 shows the results among the 180,000 schoolchildren whom we have listed.

As may be seen, there were among the 90,000 untreated schoolchildren four times as many cases of probable diphtheria as developed in the 90,000 tested children.

SUMMARY AND CONCLUSIONS

The results of twenty-five years of experimental and practical investigation of the immunizing effect of toxin-antitoxin injections and the value of the Schick test are as follows:

Three injections, 1 c.c. each, of a suitable toxin-antitoxin mixture spaced one or two weeks apart, will cause about 85 per cent. of susceptible children or older persons to develop sufficient antitoxin to give the negative Schick reaction and produce marked, if not absolute, protection against diphtheria.

The development of the immunity is slow. An amount of antitoxin sufficient to prevent the positive Schick reaction develops in the different children in from one to six months after the receiving of the injections. Antitoxin as heretofore must continue to be used to produce immediate immunity.

The duration of the immunity in at least 90 per cent. of the children is for more than six years and probably for the remainder of life. There seems to be no dif-

ference in this respect between these, and those who develop antitoxin naturally.

Toxin-antitoxin injections should not be given within two weeks of an injection of antitoxin; otherwise the toxin is slightly overneutralized and the resulting development of antitoxin is lessened.

Mixtures made from old toxin and antitoxin are fairly stable and may be used for a period of one year. Even such preparations are at their best when first sent out, as the mixtures slowly tend to become at first neutralized and then slightly antitoxic. This change gradually lessens the immunizing power of the toxin. The toxin-antitoxin should be kept cool and in a dark place; it is best to use the mixtures within three months of their final preparation.

A toxin-antitoxin mixture of stabilized materials which is safe when it leaves the laboratory cannot become more toxic in being kept. No serious effects have ever resulted from the injections given to the tens of thousands of the New York children since we began our work seven years ago.

The Schick test is an extremely reliable means of separating those individuals who have antitoxic immunity from those that have none. Although a simple test, it must be carried out with extreme care. The toxin must be retained intracutaneously, and the toxin must be neither 25 per cent. more nor less than the desired amount. It is extremely important to choose glass of suitable chemical composition for the containers in which the toxin is to be placed, as otherwise rapid deterioration may take place.

The preliminary Schick test is usually omitted in children under 3 years of age. This is for two reasons: 1. Two thirds of these children require the toxin-antitoxin injections anyway. 2. We are not certain whether those that do give the negative reaction are immune because of an unusual persistence of the antitoxin given them by their mothers, or because of the active development of antitoxin in their own

bodies. After this age the test is desirable, but it is often omitted.

Thus, in practical school work, the first Schick test is frequently omitted in children up to the age of 6 because it is easier to inject the children at once rather than to delay for the test. At this age the percentage of children requiring immunization is still high, and the annoyance from the injections is slight. The omission of the preliminary Schick test facilitates the introduction of the immunizing injections in the schools. Above the age of 6 years, the preliminary Schick test should be made whenever practicable.

No child should be pronounced immune from diphtheria because of having received three immunizing injections of toxin-antitoxin. A negative Schick test is absolutely necessary before one can properly make such a statement or issue a certificate.

The use of the control protein test made with the heated toxin is advisable at all ages when a careful separation of the pseudonegative reaction from the combined positive reaction is important. As with the Schick test, it is frequently omitted because of local conditions. The older the child the more likely it is to be immune and to give a confusing protein reaction. In children under 5 years of age, the protein reaction seldom confuses the picture if the Schick tests are read as late as on the fourth day; between 5 and 7 years, the control does not help greatly in more than 5 per cent. In older children and adults, not only does the control protein test help us to decide more correctly in about 10 per cent. of doubtful reactions, but when it is marked it also indicates with some probability those persons who are likely to have the marked local and constitutional reactions from the toxin-antitoxin injections.

The toxin-antitoxin injections are inadvisable before the age of 6 months. During this time most of the infants retain the antitoxin received from their

mothers. Up to the age of 3 months, immunizing injections are usually ineffective, as the infant tissues do not respond sufficiently during this period to the toxin-antitoxin to produce antitoxin. Under usual conditions, it is probably safe to wait until the infant is 9 months old and then to give the injections at the first suitable occasion. During the first three years there is almost no annoyance from the injections. As the child grows older, the danger from diphtheria gradually lessens, and the percentage of those developing annoying local and constitutional reactions slowly increases.

The immunization of schoolchildren in acting to prevent their contracting diphtheria also lessens the exposure to infection of the younger children of preschool age in their families.

There appears to be no difference in the degree of immunity between those individuals who have developed antitoxin from natural causes and those who did so because of the stimulus of the toxin-antitoxin injections.

Institutions in which the children have been given the immunizing injections have been remarkably free from diphtheria.

The schoolchildren who have been injected have had one-fourth as many cases as the untreated children, and these cases have been of less severity.

ABSTRACT OF DISCUSSION

Dr. Abraham Zingher, New York: I should like to mention one or two points in connection with the work that we are planning for this summer among children of preschool age. We have practically finished all the public schools in New York City. A great educational campaign has been conducted through these schools in teaching the people the great value of these newer preventive measures against diphtheria. More than 800,000 homes have been reached. We intend to utilize this valuable propaganda. We shall offer the people the opportunity of having their children who are from 6 months to 6 years of age protected against diphtheria. This work will be carried out in the baby health stations, in the day nurseries and in the various mothers and babies' playgrounds in the public schools. We are emphasizing the fact that every child in

this age group should be inoculated against diphtheria just as it is vaccinated against smallpox. We shall give these young children the three injections of toxin-antitoxin without a preliminary Schick test; reserving, however, the issuing of a diphtheria protection certificate for the time when the children show a negative Schick reaction. These Schick tests will be made when the children are admitted to school. We feel quite strongly that no child should be pronounced immune to diphtheria until it shows a negative Schick reaction. Another point worth emphasizing is that we found great variations in the immunity response to the same mixture of toxin-antitoxin in retesting several thousand schoolchildren who had been injected with two doses, each 1.5 c.c., of toxin-antitoxin. The number of children who showed a negative Schick retest varied in different schools from 25 to 75 per cent. One of the interesting facts in connection with these results is that the percentage of successfully immunized children in a school was in inverse ratio to the percentage of children who had given a positive Schick reaction at the original test. We noticed no symptoms of anaphylactic shock in giving more than 100,000 injections of toxin-antitoxin. This was also true when repeated series of injections of toxin-antitoxin were given. We shall be glad to send the literature that we use in our work in the schools and in the baby health stations to any physician who is interested in this subject. He should write for it to the Research Laboratory of the New York City Department of Health.

Dr. John F. Hogan, Baltimore: From studies made recently in Baltimore we know that more than 80 per cent. of the deaths in that city from diphtheria were from the laryngeal type. We have no reasons for thinking the rest of the country is different. It is well known by those who have worked in infectious diseases, especially dipththeria, that a great many of the deaths between the ages of 2 and 5 are from laryngeal diphtheria. Therefore, if we are going to do any good with toxin-antitoxin we must start before the child reaches the age of 2 years. In Baltimore we are going to make a drive for toxin-antitoxin, and we are using the schoolchild as an opening wedge. We are having the schoolchild bring the mother with the baby at the time the second dose is given. In that way we shall reach the young children before they reach the most susceptible age. With the amount of knowledge that we have of the pathologic, etiologic and epidemiologic peculiarities of diphtheria, its death rate should be practically nil and, if we succeed in immunizing practically all children, then this will be accomplished.

Dr. William H. Thaler, St. Louis: The School Hygiene Division in the St. Louis public schools has followed out this work by sending a letter to the home of every schoolchild in the city of St. Louis, recommending the Schick test, and the responses were very gratifying. It may be a mere coincidence, but this year we have had the lowest death rate in diphtheria

that I think was ever heard of in St. Louis. We also noted a peculiar situation. There was one child in one block in one of the school districts who received toxin-antitoxin and he was the only child in the block who contracted diphtheria. This incident was reported by the district nurse and later authenticated by investigation.

Dr. C. A. Earle, Des Plaines, Ill.: Diphtheria is the most dangerous infectious disease, and more children die from it than from any other infectious disease. We have reached the end of our rope with antitoxin. Diphtheria may be more prevalent now than it was before the days of antitoxin. There is abundant evidence for believing that these mixtures do the work for which they are designed. To Theobald Smith belongs the greatest credit for the experimental work, and to Dr. Park for the practical application. In a series of more than 400 susceptible children, 85 per cent. were immune six months after the injection of three doses of toxin-antitoxin. When we study Smith's experiments it becomes evident that we cannot expect to immunize all children. He shows that some guinea-pigs may be immunized by even neutral or balanced mixtures of toxin and antitoxin, while others require mixtures of varying degrees of toxicity. It is likely that there is an unknown optimum proportion of the ingredients of the toxin-antitoxin mixture required for each individual. Because of the reliability of the Schick test, no child should be given the toxin-antitoxin mixture whose susceptibility has not been demonstrated by this test. I feel certain that if the whole proposition is explained to the parents, the vast majority would prefer to have the test made first.

Dr. W. S. Rankin, Raleigh, N. C.: Last year in North Carolina the state epidemiologist went into twenty-five counties, called together the practitioners and said, "Gentlemen, your people should be inoculated against typhoid, and your children against diphtheria. I should like to propose a plan by which you can do it and be paid for it." The physicians decided they would do it. They go to the county commissioner ad say, "We want to organize with the help of the state board of health a number of public dispensaries to be held for five weeks in this county at ten or fifteen different points." The state board of health sets the time and place for the dispensary, and notifies the public to come in and be inoculated. There is just enough added about the value of inoculation to educate the public. The profession itself divides up the work. Last year we inoculated 70,000 persons against typhoid fever, and 1,000 children between 6 and 12 years of age against diphtheria. The county commissioner paid the local practitioners 25 cents for each complete inoculation and that was $20,000 which went to the profession last year which otherwise would not have been received. The work of the medical profession with the state board of health does not stop when that $20,000 is paid. It goes on. In the dispensaries which were conducted in Union County, N. C., with 35,000

people, the physicians vaccinated 10,000 people in a campaign of five weeks. That was $2,500 paid to twenty physicians—only $125 each, but think of the effect on the business of the profession in keeping up that work. It goes on. The physicians are assuming the leadership in public health work, and they come into complete harmony with the public health officers of the state.

Dr. Abraham Zingher, New York: Dr. Rankin's remarks are very suggestive. I believe that in the rural sections the only practical way to carry out this work is to immunize with toxin-antitoxin every child of school age as well of preschool age. The reason is that we have found that more than 85 per cent. of schoolchildren in rural sections give a positive Schick reaction. These children, however, should always be given a final Schick test, after toxin-antitoxin injection, before they are pronounced immune to diphtheria. It is important that every health officer and school physician should be acquainted with the method of diluting bulk toxin. He will then be able to test at a cost of $1 an entire school of 2,000 or 3,000 children. Uniformity of the dilution of toxin he uses and great accuracy in the reactions he obtains will soon give the health officer confidence in the results of the Schick test. This confidence, I am sorry to say, is lacking at the present time wherever physicians use outfits supplied by many of the commercial laboratories.

DETECTION OF TYPHOID CARRIERS

REPORT OF FOUR OUTBREAKS *

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Formerly, field investigations of typhoid fever were seldom undertaken by the Minnesota State Board of Health, except in the presence of an outbreak of considerable proportions, usually traceable to a polluted water supply. Since 1911, epidemiologic field investigations have been made, as far as possible: (1) when a physician or health officer requested investigation; (2) when data furnished by the attending physician or health officer, alone or when associated with previously collected data, have indicated some local source of infection, or (3) in the absence of pertinent data, whenever time and funds have permitted, many investigations being made while the investigators were in the field primarily for some other investigation, often weeks or even months after the occurrence of a single typhoid case.

Before going into the field, the epidemiologist looks up the history of typhoid fever in the locality to be investigated, as recorded in the files of the division of preventable diseases. Our files contain physicians' original case reports and all data previously obtained from physicians and health officers and collected by epidemiologists, together with original records of laboratory examinations of blood, feces and urine, including records of Widal examinations since 1896. In addition, the records of the division of sanitation, concerning city and village water supplies, sewerage

* From the Division of Preventable Diseases, Minnesota State Board of Health.

systems and certain creameries and pasteurization plants are also accessible.

In the detection of typhoid carriers, carefully collected data, supplemented by the work of the laboratory, are necessary, as suggested below.

1. Detailed case data, with special reference to source of milk and cream, to places where patient partook of food during three weeks prior to illness and to changes in personnel in the home during the same period.

2. Widal specimens from all handlers of food and milk partaken of by patient or patients in the home and elsewhere, and from all members of patient's household.

3. Feces and urine specimens from all such food and milk handlers giving a history of typhoid or continued fever, and from those in whose blood the Widal reaction is present or atypical.

4. Feces and urine specimens from any person or persons to whom data point as a probable source of infection, even though Widal reaction and history of typhoid or probable typhoid fever are absent.

Since Jan. 1, 1913, the division of preventable diseases has identified and placed under supervision eighty-six carriers of typhoid (seventy-two) and paratyphoid (fourteen) bacilli. Four hundred and sixty cases and thirty deaths have been traced epidemiologically to these carriers, two of whom have meanwhile died.

Four outbreaks which illustrate different phases of the carrier problem have been selected for report at this time. In reality, two outbreaks each are reported under Outbreaks 3 and 4.

FIRST OUTBREAK

No cases of typhoid fever had been reported from D., a village of about 250 inhabitants, since 1913, when Dr. W. P. Greene, then epidemiologist of the state board of health, traced thirteen cases, which had occurred during the three preceding years, to a woman who had had typhoid fever in 1910, and subsequently sold milk in the village. March 4, 1921, a telegraphic request for assistance in an outbreak in children was

the first information received by the division of preventable diseases that typhoid fever had reappeared in this village.

Immediate investigation showed that eleven cases, eight in children, three in adults, in four families, as shown in Table 1, had occurred between Dec. 27, 1920, and March 2, 1921, the early cases having been diagnosed as influenza, pneumonia and "nervous breakdown." The three adult patients, and the two young children, aged 2 and 3 years, respectively, in the P. family, had attended "Ladies' Aid" meetings, attended by numerous other women and children, where light refreshments, with coffee, and milk for the younger children, were served. Except for these meetings and the usual frequent visits of close neighbors, there had been no visitors in these families, and the infected persons had not partaken of food away from home. There was no history of previous typhoid fever in the well members of the four families, and the Widal reaction was absent in blood specimens from all. Three families used water from a spring, and one used cistern water.

All four families took milk from the S. dairy. Mr. S., aged 63, who had moved to the village in September, 1920, had had typhoid fever forty-three years previously. His wife, aged 62, their four children, three of whom were away from home, and one granddaughter living with them, gave no history of previous typhoid. A hired man developed typhoid fever in 1918, while working on their farm. Mr. S. did the milking, and Mrs. S. handled the milk and milk utensils, which were never sterilized.

At the time of the investigation, six families, two of which were free from infection, bought milk from the S. dairy. A seventh family used milk from this dairy from September till November, 1920, without becoming infected. The Widal reaction was present in blood taken, March 6, 1921, from Mrs. S., who gave no

history of typhoid or other continued fever, and was absent in blood from her husband and the other members of the family living at home. *B. typhosus* was isolated from feces from Mrs. S., March 16.

It might be concluded that all cases in this outbreak were due directly to consumption of infected milk, since only one patient denied drinking or otherwise consuming raw milk or cream, at least occasionally.

A study of the incidence of cases by onset, as presented in Table 1, along with that of the data obtained, suggests that all but the first two (in very young patients, both milk drinkers) may have been secondary

TABLE 1.—DATA OBTAINED IN FIRST OUTBREAK

Case	Family	Sex*	Age in Years	First Symptoms	Widal Reaction	Water Supply	Milk Supply
1	R.	♂	2	Dec. 27†	March 18 +	Spring	S. Dairy
2	P.	♀	2	Jan. 7†	March 7 +	Spring	S. Dairy
3	P.	♂	7	Feb. 14	March 5 +	Spring	S. Dairy
4	P.	♀	3	Feb. 24	March 7 +	Spring	S. Dairy
5	H.	♀	23	Jan. 13†	March 10 Atyp.	Cistern	S. Dairy
6	H.	♀	21	Feb. 1†	March 10 +	Cistern	S. Dairy
7	H.	♀	14	Feb. 23	March 11 +	Cistern	S. Dairy
8	H.	♂	10	Feb. 28	March 10 +	Cistern	S. Dairy
9	B.	♀	39	Feb. 19†	March 7 +	Spring	S. Dairy
10	B.	♂	11	Feb. 25	March 5 +	Spring	S. Dairy
11	B.	♀	8	Feb. 28	March 11 +	Spring	S. Dairy

* In this column, ♂ indicates male; ♀, female.
† Approximate.

cases, and that there may have been but one lot of polluted milk distributed. In Case 5, in the H. family, who denied consumption of raw milk or cream, the patient may have been infected through its use in cool coffee or tea or on desserts, or she may have been infected through direct contact with the patient in Case 2, who attended "Ladies' Aid" meetings while sick, typhoid fever not having been suspected.

Cases 9, 10 and 11 in the B. family, and Cases 2, 3 and 4 in the P. family, were intimately associated, the B. family obtaining their drinking water (spring water) from the P. family's kitchen. It seems probable that Mrs. B. (Case 9) obtained infection from contact with the P. family, and that the remaining cases in the P., H. and B. families were but indirectly due

to infected milk. The fact that there was no history of previous typhoid fever in the carrier's children and that no cases had occurred among her customers in D. village for a period of three months, combined with the observation that she appeared to be a very neat housekeeper, rather favors this supposition.

SECOND OUTBREAK

April 30, 1921, assistance was requested in a typhoid epidemic in a well settled farming community in northern Minnesota. On investigation, May 1, it was found that fourteen men, all heads of families except one, had developed typhoid fever between April 10 and April 25. One secondary case developed later; and in five of the primary cases death ensued. The cases were in three townships and were from 2 to 5 miles (3.2 to 8 kilometers) apart. Each of the men had lived on his own farm for a number of years, having his own water and milk supply. Well members of but one family gave a history of previous typhoid fever. Five well members in the family of Case 8 gave a history of having had typhoid fever two years previously. (In blood from three, the Widal reaction was positive; one set of discharges from each was examined, May 12, with negative results.) There was no history of previous typhoid fever in well members of the remaining thirteen families. All fourteen men, after careful questioning, denied having eaten away from home, except two who had had one and two meals, respectively, at different restaurants, in two villages.

May 3, on inquiry as to farm sales, each recalled that he had attended a sale, April 1. About 100 persons were present at this sale. The men were served a cold lunch, consisting of pork, hog's head cheese and cheese sandwiches, cookies, friedcakes and coffee. The women and the auctioneer were served a hot meal without sandwiches.

Four women prepared the food. Three denied having had typhoid fever; and the Widal reaction was

negative in the blood of two, but positive in the blood of the third woman. Two sets of feces and urine specimens from this woman were examined with negative results. Further specimens were unobtainable. Blood from the fourth woman, aged 65, who had had typhoid fever thirty-three years previously, gave a positive Widal reaction, May 2, and *B. typhosus* was found in nearly pure culture in a specimen of feces received June 7, after six days in transit. Three of her seven children gave a history of typhoid fever.

TABLE 2.—DATA OBTAINED IN SECOND OUTBREAK

Case	Sex	Age in Years	First Symptoms	Positive Widal Reaction	Comment
1	♂	58	April 8	May 9	
2	♂	29	April 10	April 29	Died, May 4
3	♂	55	April 15	May 2	Died, May 14
4	♂	29	April 15	May 11	Died, May 22
5	♂	69	April 17	May 9	
6	♂	33	April 17	May 9	
7	♂	30	April 18	May 2	Died, May 16
8	♂	38	April 20	May 2	Died, May 7
9	♂	30	April 21	May 2	
10	♂	28	April 21	May 4	
11	♂	30	May 21	May 9	
12	♂	19	April 21	May 2	
13	♂	29	April 25	May 2	
14	♂	34	April 26	May 9	
15	♀	11	May 29	June 11	Secondary to Case 12

This carrier had prepared the hog's head cheese in her own home. It is probable that this meat was infected by the carrier in removing it from the bones, a hand process, performed before the meat becomes cold. A considerable mass of this warm chopped meat cooling slowly would act as an incubator for typhoid bacilli, if present. All who became sick had eaten meat sandwiches, although most of the men, very ill at the time of investigation, were unable to state whether head cheese or pork sandwiches had been consumed by them. Of two brothers who received head cheese sandwiches, one threw the meat away, while the other ate the entire sandwich. The former remained well; the latter developed typhoid, and died.

The severity of this outbreak, attested by five deaths, which occurred among fourteen cases, may be

accounted for by the ingestion, probably, of a massive dose of typhoid bacilli, such as might be expected to be present in food handled under conditions favoring bacterial development. The apparently long incubation period in the majority of these cases does not seem consistent with the incidence of cases in certain food outbreaks, and I believe that the actual dates of first symptoms in most of the cases were from seven to ten days earlier than the obtainable data indicated. Robust and stolid types of men are liable to throw out of account slight symptoms of illness such as occur early in the course of typhoid fever. At the time of investigation, the men were too ill to give much desired data.

TABLE 3.—DATA OBTAINED IN THIRD OUTBREAK

Case	Sex	Age in Years	First Symptoms	Widal Reaction	Comment
			1920 Outbreak		
1	♂	41	Oct. 28	Nov. 8, +	
2	♀	4	Nov. 1	Nov. 17, +	
3	♀	10	Nov. 12	Dec. 4, +	Sister to Patient 5
4	♂	35	Nov. 15	Dec. 4, Atypical	
5	♀	6	Nov. 19	Dec. 4, +	Sister to Patient 3
			1921 Outbreak		
6	♀	11	Oct. 9	Oct. 17, +	
7	♀	7	Oct. 30	Nov. 14, +	
8	♀	17	Nov. 1*	Dec. 9, +	
9	♀	4	Nov. 4	Dec. 9, +	
10	♀	24	Nov. 4	Dec. 9, +	
11	♀	20	Nov. 29	Dec. 9, +	Secondary to Case 10

* Approximate.

THIRD OUTBREAK

Between October 28 and November 19, 1920, five cases of typhoid fever, two in adults, three in children, in four families, as shown in Table 3, developed in a small village in northern Minnesota. The epidemiologic evidence pointed to the S. restaurant as the source of infection, all patients having had several meals there during three weeks prior to first symptoms. Mrs. S., aged 54, who had had typhoid fever fifteen years previously, did all the cooking and handling of food, while her husband, aged 45, who had had typhoid thirteen years previously, occasionally helped in waiting

on the table. The Widal reaction was positive in blood from both, December 6. *B. typhosus* was isolated from the urine of Mr. S., December 20. One set of urine and feces specimens from Mrs. S. was examined, with negative results. About this time, the hushand left the state, and his wife continued the restaurant business. She refused to submit discharges for further examinations. Again, during October and November, 1921, six cases of typhoid fever, three in adults, three in children, in six families, as shown in Table 3, developed in the village. Again, the epidemiologic evidence pointed to this restaurant as the source of infection. All except Patient 11, who nursed Patient 10, had partaken of food prepared by Mrs. S., either at the restaurant or on some social occasion, within a period of three weeks prior to the first symptoms. Since 1905, when Mrs. S. had typhoid fever, six cases had occurred among her relatives, her husband, two sons, a daughter, a daughter-in-law (Case 8) and one granddaughter (Case 2), all cases being directly traceable to her.

Under duress of immediate closure of her restaurant, Mrs. S. submitted specimens, and *B. typhosus* was isolated from both urine and feces received, December 6. Mrs. S. was compelled to give up the restaurant business.

FOURTH OUTBREAK

In Dakota County, two cases of typhoid fever in one family in a rural district, reported in January, 1921, were not known to have any relationship to a third case, which had been reported from an adjoining township in November, 1920. Data on these cases were given to Dr. J. A. Carter, a graduate student at the University of Minnesota, who had been assigned to the division of preventable diseases for practical field work; and, on investigation, May 25, 1921, he found that five undoubted cases of typhoid fever, involving

three families, had occurred between September, 1920, and January, 1921, as shown in Table 4.

In Case 1, not previously diagnosed, the patient had had the first symptoms of typhoid fever about three weeks after the arrival of a new houskeeper, Mrs. S. Case 2 was that of a boy who developed typhoid fever while working in the home of Patient 1, where he took one meal a day. The patient in Case 3, unreported, son of Patient 1, lived at home and after becoming sick visited Patients 4 and 5, his brother and sister-in-law, respectively.

TABLE 4.—DATA OBTAINED IN FOURTH OUTBREAK

Case	Sex	Age in Years	First Symptoms	Positive Widal Reaction	Comment
			1920-21 Outbreak		
1	♂	63	Sept. 15, 1920	May 1921	
2	♂	15	Oct. 31, 1920	Nov. 1920	
3	♂	16	Nov. 10, 1920	May 1921	
4	♂	27	Jan. 1921	Feb. 1921	Secondary case
5	♀	29	Jan. 1921	Feb. 1921	Secondary case
			Later 1921 Outbreak		
6	♂	41	Aug. 1, 1921	Nov. 1921	
7	♂	3	Aug. 10, 1921	Oct. 1921	
8	♀	37	Aug. 20, 1921	Oct. 1921	Secondary case
9	♂	14	Sept. 15, 1921	Oct. 1921	Secondary case
10	♂	13	Sept. 15, 1921	Oct. 1921	Secondary case
11	♂	5	Sept. 22, 1921	Oct. 1921	Secondary case
12	♂	39	Oct. 1, 1921	Oct. 1921	Secondary case
13	♂	7	Nov. 1, 1921	Nov. 1921	Secondary case
14	♀	47	Sept. 15, 1921	Oct. 1921	Secondary case
15	♂	6	Oct. 13, 1921	Oct. 1921	Secondary case
16	♂	9	Sept. 13, 1921	Oct. 1921	Secondary case

Mrs. S., aged 50, gave a history of prolonged illness, with symptoms of typhoid fever during the early part of 1920. Though the Widal reaction was positive in her blood in May, 1921, four specimens each of feces and urine were examined with negative results.

First knowledge of a second outbreak in two townships in the vicinity of the preceding one was received in October, 1921, when blood specimens from members of three families gave a positive Widal reaction in eight persons, six of whom had had first symptoms in August and September. Investigation disclosed that eleven cases had occurred between August 1 and November 1, as shown in Table 4. The first, Case 6, developed

about four weeks after Mrs. S. entered the home as housekeeper. Patient 7, a child in the neighborhood, visited Mrs. S. daily, and consumed food prepared by her.

The remaining nine cases, including six members of the family of Patient 7 and three persons in two neighboring families, were closely associated one with another, and were but indirectly traceable to Mrs. S. The Widal reaction was again positive in blood from Mrs. S., and at this time *B. typhosus* was isolated from urine.

SUPERVISION OF CARRIERS AND NEED FOR THEIR COMPENSATION

The state board of health, directly through its own representatives or through the local health officer, gives such instructions to be followed by the carrier and members of his family as are necessary for their protection and that of other associates, and explains the state law, which forbids a carrier to engage in the handling of any part of the public's food supply which may be consumed without being cooked after handling.

The local health officer is charged to keep the state board of health informed as to any change in the carrier's residence or occupation, and, as long as the carrier obeys directions, all publicity is avoided. In one instance only has it been necessary to prosecute a carrier for illegally returning to a forbidden occupation.

Three of the four carriers herein reported, one a dairy woman, another a restaurant keeper, and the third a practical nurse and housekeeper, were forced to abandon their chosen occupations, the nurse-housekeeper having no income aside from her earnings for the support of herself and one dependent. Such restrictions of individual rights and liberty are necessary to protect the public against these innocent distributors of disease and death.

Since 1915, the Minnesota State Board of Health has been entrusted by the legislature with the disburse-

ment of a special fund for the support of a typhoid carrier who, after unauthorized newspaper publicity, was unable to obtain work. Should not the state offer compensation to carriers who must give up their chosen occupation in order to protect its citizens?

ABSTRACT OF DISCUSSION

Dr. James J. Durrett, Memphis, Tenn.: Persons with chronic tuberculosis should not handle foods, and, if state compensation is given to one, the other should participate; also carriers of other diseases might have a just claim. The aggregate compensation thus distributed would be large, and, as we have in most places trouble getting adequate funds for recognized public health work, we should not ask for money for this purpose just yet. Formerly, when the death rate for typhoid was from 30 to 40, cases of typhoid were so numerous that small outbreaks caused by carriers were masked entirely, or made obscure and difficult to trace. With the typhoid death rate below 10, cases are sufficiently few to make even a small, sudden increase in the number stand out clearly if not conspicuously. I believe that this causes us to trace relatively more cases to carriers at this time than formerly. Sanitation that purifies our water and safely disposes of excreta goes a long way toward protecting us against carriers of the typhoid bacillus who do not handle foods. Those carriers who prepare food and handle raw milk constitute a special problem, and when detected they should be compelled to abandon this type of work, and they should be taught personal hygiene.

Dr. Joseph N. Gehlen, Minneapolis: With higher standards of water purification and with partial supervision of milk supplies in the larger cities and villages of Minnesota during the last few years, most of our outbreaks have been caused by carriers, although we have not always been able to trace the source. The question is what to do with carriers after we find them. We keep food and milk handlers out of business, and it does not seem fair to have their usual method of livelihood taken away from them without some form of compensation.

MALARIA CONTROL OPERATIONS IN RELATION TO THE ULTIMATE SUPPRESSION OF THE DISEASE *

C. C. BASS, M.D.
NEW ORLEANS

In his book on "The Prevention of Malaria," Sir Ronald Ross [1] shows by elaborate mathematical calculations, and in quite a convincing way, that sufficient reduction in the anopheline density in a given area would ultimately result in the complete disappearance of malaria from the area without the reduction necessarily being carried to total elimination of anopheles. In other words, it is not necessary to secure 100 per cent. of anopheline control to secure 100 per cent. of control of transmission of malaria. This is based on the small proportion of the total number of anophelines produced, which chance to live long enough, bite favorable gamete carriers and later bite other susceptible individuals. In a large area, especially one not densely inhabited, there must be many thousands of anophelines produced, on an average, to one that actually transmits malaria. He argues, therefore, that, if the anopheline density is reduced to below this theoretical point, malaria will ultimately disappear. On the other hand, reduction of the number of carriers by curing the infection would not eliminate malaria entirely unless every infected person in the locality was disinfected and no others came in; provided, of course, that the anopheline density remained the same.

This is based on the assumption (which I am bound to think is correct) that the anopheline density and

* From the Tulane University of Louisiana School of Medicine.

1. Ross, Ronald: The Prevention of Malaria, New York. E. P. Dutton & Company, 1910.

malaria prevalence would be evenly distributed and that the reduction resulting from antimosquito operations or from treating the carriers would also be equally distributed over the area under consideration. As a matter of fact, it seems to me that, in practice, the very opposite would probably be the case. There is no reasonable probability that either antimosquito work or cure of carriers will be evenly effective over any very large area. In any such large area, there would almost certainly be spots that had been overlooked or were insufficiently sanitated, where prolific breeding would continue, although breeding over the area generally had been reduced to below the necessary extent to permit transmission. If such less well controlled spots were favorably located with reference to malaria carriers and susceptible persons, transmission would continue there and malaria would continue to be present indefinitely. This would be the case, however effectively the other part of the area was controlled.

The same thing is true with regard to control by curing carriers. Although all carriers in a small area, including a small group of people, may be cured of their infection, so that no further transmission will take place, no such thing can be hoped for when large areas, such as whole counties or states, are considered. There will be some carriers not discovered; others may not be disinfected by the treatment taken, and others may refuse treatment. If such carriers are favorably located for transmission with regard to anopheles breeding places and to other persons, transmission will occur and malaria will not disappear. So far as I know, no intensive quinin control operation has been so successful in any large area as to eliminate all the carriers. Therefore malaria has not been completely suppressed in this way; nor do I believe that it can be. Neither do I know of any instance in which the disease has been completely suppressed in large areas by mosquito control operations carried out for the purpose of malaria control.

However, there are many instances in which developments leading to mosquito control, often more or less incidentally, have led to total suppression of malaria over quite large areas. I refer especially to the disappearance of malaria in this country during the past fifty or 100 years from large areas in New York, Pennsylvania, Ohio, Michigan, Illinois, Missouri and other states. This did not result from any intensive anti-mosquito operations, nor from screening. It resulted chiefly from the mosquito control that came from the clearing, drainage and other activities incidental to the march of civilization, and the development of the country for agricultural and industrial purposes. Much reduction had occurred, and, in fact, the disease had disappeared from large areas before the mode of transmission was known and before wire screens were used to any considerable extent.

During later years, use of screens, no doubt, whether intended for malaria control only or for other useful purposes as well, has hastened malaria elimination from the areas in which these natural developments were already bringing it about. Every transmission prevented by screens, which would otherwise occur, reduces the disease in the area to that extent and tends to hasten the time when there will be no more malaria.

No doubt cure of infected persons with quinin has also favored or hastened elimination of the disease from some of these regions by the developments incident to civilization and settlement of the country. Every person cured of his infection means just that much reduction of the chance of transmission.

While both of these things, screening or other anti-mosquito measures and the cure of infected persons, have contributed to the final suppression of malaria in some of these heavily infected regions, they have been contributing or, I may say, hastening factors only. The real cause has been development incident to civilization and settlement. Without this, malaria would not have disappeared.

What has occurred in this regard in England and in many European countries, and in these regions referred to in this country, is in progress over practically the entire malarious area in the United States. As the country is developed for agricultural and other industrial purposes, the prevalence of malaria slowly but surely declines. If we can look forward to a high state of development of the entire country, so also can we look forward to suppression of malaria, however much or little intensive malaria control work is done. At the present rate, it will be a long time until malaria has entirely disappeared. It will disappear, however, depending on whether, or when, settlement and development goes forward to the necessary extent.

The chief operations that bring about suppression of malaria are drainage and filling and clearing of the forests; not such as is done for the purpose of controlling malaria, but the much larger operations for settlement and development. The only permanent part of our present intensive malaria control operations is the permanent drainage and filling operations.

Since suppression of malaria inevitably results from the slow march of civilization and development, health agencies are interested chiefly in promoting such activities as will favor and hasten this result, especially those more or less temporary measures that lessen the prevalence of the disease during the period of more permanent development. This includes both antimosquito work and the proper treatment of infected persons with quinin. Each is useful, and they should generally go hand in hand. There are few instances in which antimosquito work would not be more effective in less time if combined with cure of the carriers. There are also few instances in which quinin control activities would not yield better results if combined with more or less mosquito control. The question is which is the more important and what proportion of attention should be given to each.

When considered from the standpoint of control of malaria in small areas, mosquito control has several decided advantages. The sanitation necessary tends to control other diseases and nuisances, while quinin does not do so.

When we compare the two measures from the broad standpoint of reaching the real malaria problem of this country, I believe that we must look to quinin as a most important factor. However much more desirable mosquito control may be, and however effective it may be in small areas, it must be practiced on a much larger scale than it has been in the past if it is really to effect the malaria prevalence over the whole country to any considerable extent.

Whether intensive mosquito control operations can ever have much influence on the big malaria problem of this country depends largely on the area that it is possible to reach in this way, compared with the area over which malaria prevails. Cost in money and man power and supervision or direction is a large item. In fact, this is one of the limiting factors. However certain the results might be, if the necessary resources cannot be obtained, the method cannot be applied.

Numerous demonstrations of malaria control by eliminating mosquitoes in small areas, chiefly towns and villages, have been made during recent years by the United States Public Health Service, the International Health Board and state boards of health. Many of these have yielded about as perfect results as could be asked for, constituting most convincing demonstrations of the effectiveness of sanitation.

I do not think the total area ever covered by intensive mosquito control work in this country, including the extracantonment zones during the war, would exceed 2,000 square miles (5,180 square kilometers). This is less than the area of three good sized counties. This is not more than one five-hundredth part of the total malaria infested area of the country. This emphasizes the fact that these operations have had

little effect on the total malaria of the country, however completely malaria may have been controlled where they were conducted.

The cost of malaria control operations involving mosquito control by sanitation under experimental conditions or under such conditions as existed during the war does not serve as a suitable basis of cost. It costs much more under such conditions than when done under more favorable conditions.

A thing cannot be done unless the cost can be met. I refer to the cost not only in money, but also in other resources. I believe that those familiar with the most favorable of these successful operations must fail to see how the same operations can ever be applied to the entire malaria infected area of this country.

It must be recalled also that most of these operations have been carried out in towns and cities in which there is a more or less dense population and, by the way, where there is comparatively little malaria. The per capita cost, therefore, was comparatively low.

When we transfer mosquito control by similar intensive methods to the rural part of the country, where the malaria problem really exists, the per capita cost becomes much greater. In fact, it becomes so great that the extent to which such work can be done is certain to be limited. It cannot be done to an extent sufficient to affect seriously the total malaria prevalence.

The least expensive intensive mosquito control operations usually involve the expenditure of hundreds of dollars per square mile. An expenditure of even $100 a square mile would amount to an enormous sum if applied to the more than half a million square miles in the United States where malaria prevails. I do not question that it would be well-spent money. Nevertheless, it is money that would not otherwise be spent, and therefore represents new money.

Such antimosquito measures as screening homes also represents the expenditure of money that would otherwise not be spent. Do not misunderstand me. I

most assuredly favor screening all homes where malaria prevails, as well as others. It would certainly cut down the malaria rate tremendously; but it would be done at an enormous outlay of money for the purpose. It does not matter whether antimosquito measures are carried out as a part of an intensive plan involving considerable effort and perhaps expenditure of money by the health agency behind it, or whether it is done by the people themselves as a result of publicity and educational work; it still represents an enormous outlay of money for prevention of disease that would otherwise not be spent. It is true that it would still usually cost less than the disease it prevents.

Let us now look, from the same standpoint, at the control of malaria by cure of infected persons with proper quinin treatment, to see whether it is likely to be correspondingly expensive and, as a result, equally difficult of application to the whole malarious region of the country. People who have malaria may take proper quinin treatment to cure their infection, as a result of either intensive control operations which include this measure, or a general publicity resulting in making the supplies of standard quinin treatment available for those who need it, so that they will purchase it in place of other less effective remedies, or on the advice and directions of physicians who give their patients the proper treatment. In either case, I feel sure the cost of the necessary quinin would be less than the average cost of the other remedies that would be purchased at the same time if the standard quinin treatment were not used. If this is true, control by quinin involves only the expenditure for medicine of money that would be spent for other medicine. No new money is required.

Therefore, so far as cost is concerned, quinin is applicable to the whole malarious region of the country without cost, except for such publicity, propaganda or other activities as are necessary to get it done. In this respect, quinin control has a decided advantage over

mosquito control, which involves outlay of so much money that would not otherwise be spent. For this reason, I believe quinin control is likely to prove a much greater factor in contributing to and hastening the suppression of malaria, in large areas or in the country as a whole, that inevitably results from development, than mosquito control operations undertaken for the purpose of controlling malaria or mosquitoes, so far as methods are known at the present time.

If this opinion is correct, among the most important activities of health agencies interested in malaria control are those that lead to the provision of proper quinin treatment for persons who have malaria. The rapidly increasing adoption of the standard quinin treatment by physicians and the growing use of it in place of the many less effective remedies offer much encouragement to workers in this field. If this continues, it is reasonable to expect that it will hasten and contribute to the ultimate suppression of the disease in large areas in this country.

SUMMARY

1. Malaria has disappeared from large areas in this country and in other parts of the world, chiefly as a result of development of the country, including drainage and clearing of the forest, incident to agricultural and other industrial pursuits.

2. Malaria prevalence is slowly but surely decreasing over practically all of this country, as a result of the steady march of civilization and settlement of the country.

3. This process may be aided and hastened by anti-mosquito measures or the proper use of quinin. Health agencies are interested in encouraging these measures.

4. The only part of our present malaria control activities that actually lead to ultimate suppression of the disease is permanent drainage and filling operations. All others are temporary and must be continued

indefinitely, or the tendency will be toward a return to former conditions.

5. The cost of intensive antimosquito operations for malaria control is so great that they have not been applied to a sufficiently large part of the total malarious area of the country to effect seriously the total prevalence of the disease.

6. The cost of such malaria control as results from infected persons taking proper quinin treatment does not involve any cost over the amount that would be spent for other remedies. Therefore, it is applicable to the malaria problem of the country as a whole, and should be emphasized and encouraged by health agencies interested in malaria control.

ABSTRACT OF DISCUSSION

Dr. L. D. Fricks, Memphis, Tenn.: Dr. Bass is one of a very small group who, having realized the importance of malaria to the South and its blighting influence on agricultural and industrial development, have fought for its control year after year. I am in thorough accord with all that Dr. Bass has said as to the importance of adequate quinin treatment in controlling malaria. Certainly, malaria has been controlled in some localities by the use of quinin. In a county of 25,000 population heavily infected with malaria, the U. S. Public Health Service, following the methods employed by Dr. Bass in Mississippi, demonstrated that malaria could be enormously reduced by the general distribution of quinin in proper dosage. The U. S. Public Health Service has approved the standard quinin treatment for malaria, and recently has issued instructions that all patients in Public Health Service hospitals be given this treatment in preference to other methods of administering the drug, and advised that no malaria patient be discharged as cured immediately on the disappearance of active symptoms. It should not be forgotten, however, that the U. S. Public Health Service has also demonstrated in many places that malaria can be controlled by drainage; that it has been frequently controlled by top feeding minnows; by proper screening, or by oiling, and that over large areas it has even disappeared in the wake of agricultural development without effort or deliberate intent on the part of the people concerned. Knowing these facts, I cannot find myself in accord with any seeming reflection on any of the methods of malaria control just mentioned. They all have their lim-

itations and their uses, but the malaria problem is so huge and local conditions are so varied that we must avail ourselves of all approved methods in stamping out this disease, relying more on one method in this community, more on another in that, and combining them all, if local conditions demand a combined attack. I feel that too much importance has been attached by the advocates of each method of malaria control to the direct results obtained by them in their investigations or demonstrations. This is only natural, of course; but to my mind the educational value of a successful demonstration in malaria control is of far greater importance than any immediate result that can accrue in the United States for some years to come. Education of the people and the fitting of malaria control into the permanent health program of the different state health departments are the big things to be done in the fight against malaria at the present time.

Dr. M. P. Ravenel, Columbia, Mo.: One point was not touched on, namely, permanence of results, though Dr. Bass did say that if the civilization of a country left it, as in the case of the Roman Campagna, then malaria would return. As I see the matter, it may be put thus: Where drainage or filling is carried out, malaria is banished from that particular place for all time. When malaria is controlled by quinin, it may clear up, but it will always spread from the borders of the cleared up district toward the interior. The effect of quinin, in other words, is only temporary. Drainage, filling, etc., are permanent measures, and in the consideration of the relative costs of any procedure, these points must always be borne in mind.

Dr. Isaac D. Rawlings, Springfield, Ill.: There was a time when malaria was a very prevalent disease in northern and central Illinois. It is said that in those days quinin was set on the table at mealtime with almost the same regularity during the malaria season as was the sugar bowl or salt and pepper shaker. I recall vividly in Kansas in the early days how I and my brothers and sisters had to take "that bitter stuff" and how the good mother kept track of the "chill day" of the individual members of our family. It meant a bigger dose of quinin the night before and the morning of "chill day." As I recall the modus operandi of the "quininization" of those days, I feel sure that many of us discontinued treatment too soon, as relapses were frequent; but the very general use of the remedy in the various communities cannot be questioned. I cannot escape the conviction that tile drainage, at least in northern Illinois and other Northern states, had more to do with the elimination of malaria and the permanent solution of our malaria problem than did the very general use of quinin. Through the widespread educational propaganda advocated by Dr. Bass, people can undoubtedly

be persuaded to use quinin to a considerable extent; but education is not and cannot be made a "cure all" in malaria campaigns, for results are slow in achievement, owing to the relative indifference of the individual both as to his personal welfare and the best interest of his neighbor, even if he is intelligent and all the facts have been presented in the most convincing manner. Education per se will not remedy the malaria situation, because the malaria carrier looms so large as an important factor and the difficulty of imparting the importance of the "cure to completion" to the average lay mind is too great to give promise of the necessary high percentage of efficiency. Many persons with all the facts presented discontinue treatment long before the eight weeks' prescribed course of treatment is completed. The method advocated by the author is one of the most important of several methods of control; but experience has abundantly shown in many areas that the former swamps which are today the most habitable and desirable places to live in were made so by a combination of thorough treatment; elimination of the malaria carrier; drainage or filling in of swamps and pools, where possible; substitution of larvicides for drainage or filling; removal of obstructing underbrush; use of "top minnows"; the screening of houses, and the control of water containers. We may regard the control of malaria as a short chain consisting of the three links: (1) infected persons, (2) anapholes mosquitoes (the connecting link) and (3) the noninfected person. An aggressive attack on any one of these links in time, if 99 per cent. effective, will solve the problem.

Dr. S. W. Welch, Montgomery, Ala.: The South has virtually admitted this malaria problem, and has gone about the task of getting the best methods possible to rid itself of the stigma of having a disease which is not common to other parts of the United States. The U. S. Public Health Service and the International Health Board have come to the assistance of the state boards of the South, and state-wide malaria campaigns are now on. The work is being carried on in a systematic way directed by Dr. Fricks, whose headquarters are at Memphis. All the Southern health officers and all the state boards of health have accepted the leadership of the U. S. Public Health Service in this work and we are actually eliminating malaria from the Southern states. In my own state, Alabama, since 1917 the number of deaths from malaria has fallen from 530 in 1917 to 231 in 1921. There will be fewer deaths this year than there were last year. This campaign is a vital organization, and we expect within ten years to show you the fairest country in the world entirely free from special health problems. Large drainage projects are being promoted all over the South. In 1916, top feeding minnows were put into the impounded waters of the Coosa

River. The state board of health has aided in the distribution of them, until now there is not a little branch that is not filled with these little fish which feed on the mosquitoes.

Dr. W. C. Woodward, Chicago: There is one aspect of malaria control we often overlook. We are staggered by the enormous cost of filling and draining mosquito breeding lands because we view the matter only in the light of an annual appropriation. We do not view such projects as we should, not from the standpoint of one year, or even of five or ten years, but from the standpoint, as Dr. Ravenel has pointed out, of all time. If you cannot spend a million dollars this year for filling and draining, possibly you can spend a million dollars in the course of twenty-five years, and in that way blot out malaria. There is another financial point often overlooked, and that is the actual money return that drainage and reclamation projects bring through increasing the value not only of the land drained and reclaimed but also of land for considerable distances in all directions around. It is only fair that those whose lands are benefited be assessed to the extent at least of the value to which their lands are enhanced by the improvement. If we deduct from the cost of the average reclamation project the value of the land reclaimed and the amount of the enhancement of values of nearby property, I am quite sure that the cost of permanent abatement of mosquito breeding nuisances will be very much lower than appears at the first glance.

Dr. C. C. Bass, New Orleans: Dr. Fricks feels that perhaps the discussion is to some extent a reflection on the other methods of malaria control. That is just as far as could possibly be from my intention. He misunderstood me. There is nobody who appreciates more than I do the absolute control of malaria that can be accomplished by mosquito control measures. The point I wish to make is that the only method that is applicable to the malaria problem of the whole country at present is quinin control. It can be brought about by publicity without cost except for the comparatively small cost of the publicity required. On the other hand, any mosquito control undertaking for malaria control is too expensive to be applicable to a very large area. I quite agree with those who have entered into the discussion that the only permanent malaria control that we are getting is the result of permanent drainage and filling operations. Our temporary mosquito control and our quinin control are simply temporary measures which ultimately will lose their force if neglected or discontinued. However, the work that is being brought about by the natural development of the country, and this intensive work in permanent filling and drainage operations, will finally bring about the desired results. I wish also to point out that the disappearance of malaria from Illinois and Kansas, referred to by Dr. Rawlings, was

aided by the use of quinin, which no doubt hastened the process. The purpose of my paper was to emphasize the idea that we ought further to encourage more extensive proper use of quinin and hasten the process of malaria reduction that is going on all over the country just as it has in these states. Dr. Welch pointed out that the malaria death rate in his own state had been reduced perhaps 50 per cent. in four or five years. That is probably largely due to the wide publicity that health officers and their assistants have given to the proper treatment of malaria. I believe that quinin is one of the most important contributing factors in the reduction of the death rate from malaria that has occurred in his state and in most of the other Southern states during the last few years.

NUTRITION IN SCHOOLCHILDREN

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It is not the purpose of this paper to discuss nutrition from the standpoint of calory requirement, relative protein nutritive value, vitamin content or metabolic processes. Our inquiry is directed more particularly to certain phases of nutrition work now being widely attempted in the schools, and which may affect, for better or for worse, 20 per cent. of the total population, representing the approximate school enrolment of a given community.

For untold generations, men and women have been born, "had their being," and died at a ripe old age, without thought of the state of nutrition or the character of the food ingested other than that inspired by a catholic appetite. But, within the last few years, all has changed, and the popular conception of malnutrition is—shall I say?—so inaccurate that the veriest tyro in public health work, after placing a child on a scale and noting comparative results, gravely announces the percentage of malnutrition in a given population group, and, in addition, prescribes the remedy.

Nutrition, or rather its opposite, malnutrition, bids fair to become a fad with large numbers of people of limited training and experience in health matters, although such men as McCollum, Mendel, Osborne, Hess and Unger in this country and many investigators in other lands as yet but "see through a glass darkly," despite the great advances made by them in the knowledge of metabolic processes and relative food values.

REPORTED PREVALENCE OF MALNUTRITION IN SCHOOLCHILDREN

The percentage of "malnutrition" (underweight) in schoolchildren reported by different observers varies

widely, not only for children residing in the same locality, but also for those residing in urban as contrasted with rural communities.

According to Emerson,[1] approximately one third of the schoolchildren of the country suffer from malnutrition. In New York City, there seems to have been a progressive decline in the percentage of malnutrition observed in schoolchildren, as shown in Table 1.[2]

The data first reported for New York City are based largely on estimates of nutrition according to the Dunfermline scale. Later, however, the relationship of weight to height was considered also in estimating nutrition status.

TABLE 1.—MALNUTRITION IN NEW YORK SCHOOLCHILDREN

Year	Number Examined	Percentage of Undernourishment
1917	171,691	21.6
1918	184,374	19.0
1919	248,064	20.0
1920	241,064	17.7

Walter S. Cornell,[3] director of medical inspection of schools, Philadelphia, reports that from 5.6 per cent. to 22.3 per cent. of 12,817 schoolchildren recruited from the poorer districts of that city are 10 per cent. or more underweight, as shown in Table 2.

Of 26,318 schoolchildren examined in Cleveland, 1921-1922, L. W. Childs, director of health education for the board of education of that city, reports that 3,914, or 14.8 per cent., were 10 per cent. or more underweight, according to the Emerson scale.[4]

During the present school year, 17.9 per cent. of the schoolchildren of Detroit were found to be 15 per cent. or more underweight.[5]

In a survey made by the Elizabeth McCormick Memorial Fund,[6] Chicago, in 1920, 57.7 per cent. of

1. Emerson, W. R. P.: Nutrition and Growth in Children, 1922.
2. Month. Bull. Dept. Health, New York City, May, 1921, p. 109.
3. Cornell, W. S.: Personal communication to the author.
4. Childs, L. W.: Personal communication to the author.
5. Week. Health Rev. Dept. Health, Detroit, Feb. 18, 1922.
6. Wood, Mrs. Ira Couch: Nutrition Classes in the Chicago Schools, Mod. Med. 2: 388 (May) 1920.

the children attending a school situated in a "comfortable semiurban neighborhood" were reported as malnourished, and but 16.2 per cent. of those attending a school of the stockyard district were so classified. According to those reporting, this seems to indicate that, so far as these children are concerned, underweight is not altogther a question of either the quantity or the quality of the food supplied.

Reports of underweight observed in rural schoolchildren vary even more widely than do those for the cities. Service officers engaged in field investigations

TABLE 2.—WEIGHTS BELOW NORMAL IN PHILADELPHIA SCHOOLCHILDREN

No. Weighed	9.9 per Cent. Underweight		From 10 to 12.9 per Cent. Underweight		13 per Cent. or More Underweight		Total No. 10 per Cent. or More Underweight		
	No.	%	No.	%	No.	%	No.	%	Comment
470	382	81.0	59	12.5	29	6.0	88	19.0	Poor and colored
862	709	82.2	67	7.8	86	10.0	153	18.0	Poor textile workers
922	795	86.0	97	10.5	30	3.0	127	14.0	Poor textile workers
1,000	898	89.6	53	5.4	51	5.0	104	10.4	Moderately poor, American and German
505	454	89.9	35	6.9	16	3.2	51	10.1	Poor, Jewish and colored
1,079	1,002	92.8	36	3.3	41	3.9	77	7.2	Jewish and poor
867	810	93.4	20	2.3	37	4.3	57	6.6	Rowdies, white and colored
213	201	94.4	6	2.8	6	2.8	12	5.6	Poor, white and colored
906	704	77.7	..	....	..	....	202	22.3	Colored
1,067	902	84.5	..	....	..	....	165	15.5	Poor native whites
949	755	84.3	..	....	..	....	194	15.7	Poor native whites
1,473	1,259	85.5	..	....	..	....	214	14.5	Native whites
468	407	87.0	..	....	..	....	61	13.0	Moderately poor, white and colored
1,143	1,010	88.4	..	....	..	....	133	11.6	Poor, colored
891	818	91.8	..	....	..	....	73	8.2	Jewish, poor
12,817	11,107	....	..	....	..	....	1,711		
Average.....		86.7	..	....	..	....	.....	13.3	

in child hygiene have, for a number of years, directed comparative studies of underweight in the schoolchildren of several states, as a part of these investigations. Following are some of the reported observations:

In Missouri, 1920-1921, of 9,214 schoolchildren examined in twenty-two towns, 38.3 per cent. of them were 7 per cent. or more underweight, as compared with 34.5 per cent. of the 1,698 children examined in the schools of three rural communities.

In five Mississippi counties, of 11,270 white schoolchildren and 5,840 negro schoolchildren weighed and measured in 1920 and 1921, 5,436, or 48.2 per cent., of the former, and 3,111, or 53.2 per cent., of the latter were 7 per cent. or more underweight, respectively. However, these percentages may not accurately represent the prevalence of underweight among the schoolchildren for the state at large, because the counties selected for study are notably affected by hookworm and malaria.

Of 1,841 children attending school in a favorably located and prosperous county in Florida, who were weighed and measured in 1921 and 1922, 591, or 32.1 per cent., were 7 per cent. or more underweight.

WHAT IS MALNUTRITION?

In view of the varying and alarming percentages of malnutrition reported by different observers, one might well pause to inquire whether malnutrition is a distinct pathologic entity or merely a symptom. If the former, is the very great reported prevalence due to a newfound ability to recognize a disorder that has been of common occurrence for years past, or to change in the quantity, quality, selection and preparation of foods in common use? On the other hand, may not the widely varying percentages be due, in very large part, to the use of inexact standards for measuring nutrition, and, in instances, to defective and inaccurate apparatus?

I am not prepared to accept the popular conception of malnutrition as a distinct pathologic entity, and I believe that it is a symptom due to manifold causes operating either singly or in combination. This point of view is very succinctly set forth in a statement by Sir George Newman, quoted by Frank A. Manny, special investigator of the New York City Bureau of Welfare of School Children:

> In endeavoring to estimate a child's nutrition or its opposite (viz., malnutrition), we must think not only of bulk and weight of body but of ratio of status to weight; of the general balance and "substance" of the body and of its carriage and

bearing; of the firmness of the tissues; of the presence of subcutaneous fat; of the condition and process of the development of the muscular system; of the nervous and muscular system as expressed in listlessness or alertness, in apathy or keenness; of the condition of the various systems of the body, and, speaking generally, of the relative balance and coordination of the functions of digestion, absorption and assimilation of food, as well as of the excretion of waste products. It is obvious that these are data which are likely to lead to a much more reliable opinion than the consideration of any one factor or ratio, however, expeditiously obtained or convenient in form or practice, and these data will demand a wider as well as a more careful and accurate observation of the whole physique of the child. Nor can an ultimate opinion always be formed at one inspection at any given moment. For nutrition, like its reverse, malnutrition, is a process and not an event.

Many factors are conducive to underweight. Of these may be mentioned causes relating to the diet, to personal and general hygiene, to lack of exercise or to overexercise, to defect and disease, to possible inherited tendencies and to environment, all modified in varying degree by the economic and educational status of individual parents, and the disciplinary control exercised by them over their offspring. Furthermore, is weight alone a true measure of nutrition? Is it not possible to fatten a child, as, for example, an infant fed for a prolonged period on condensed milk, and yet fail to promote proper skeleton growth or increase in vital stamina? Is it not possible, by regulating the diet and daily routine, to cause a child to take on fat, even in the presence of a grave pathologic lesion, and this without removing the cause? Underweight, or malnutrition, if you please, is a distinct medical problem that must be combated by medical measures.

STANDARDS OF NUTRITION

A number of different standards of physical development have been advanced for use as a measure of the state of nutrition. Practically all of them estimate nutrition in terms of weight. The standards most generally used in this country are two; one devised by W. R. P. Emerson of Boston and the other by

Thomas D. Wood of Teachers' College, New York. Both of these standards are based on weight in relation to the standing height according to sex, with the difference that Wood's tables consider the height and weight in relation to age. The more recent tables promulgated by Emerson also take into consideration the age factor. The chief objections to these tables are:

1. The standing height, which is subject to wide individual variation, is used.

2. They represent the average measurements of large numbers of children, it is true, but include children who are undernourished, or who are suffering from physical disability in varying degree; no doubt, including the measurements of a number with spinal curvature and other deformities which materially affect stature.

3. A percentage deviation from the average is arbitrarily adopted to represent undernourishment, ranging from 7 per cent., according to Emerson's standards, to 10 per cent., according to those advocated by L. Emmett Holt.

4. They fail to take into consideration hereditary factors which influence stature, on the assumption that the height-weight index applies to all races. This may be true, but has not yet been conclusively proved.

5. They are confessedly approximations.

BALDWIN'S TABLES

For a number of years, the child research station of the University of Iowa has been making a series of observations of special groups of children, under the direction of Dr. Bird T. Baldwin.[7] These children have been examined from year to year, and carefully measured and weighed, and the results have been embodied in tables that represent probably the most scientific study of this problem which has yet been made in this country.

7. Baldwin, B. T.: Physical Growth of School Children, Extension Div. Bull. No. 59, University of Iowa, Dec. 1, 1919.

Objections to Baldwin's tables are based on the ground that these measurements represent a selected group of children who, because of the very fact of their being weighed and measured periodically, are subjected to special bettering influences; a group which probably becomes more select through the falling out of the unfit from year to year. Furthermore, although these data were collected in widely separated communities, the number of children included are relatively few as compared with the total for the country as a whole. Considering the reported sources of the data used, the measurements of certain age groups may not be representative because based on a larger or smaller amount of data from single localities, with possible complicating race factors.

FOREIGN STANDARDS

Considerable interest in two foreign standards of nutrition has been manifested in this country within the last two years: Pirquet's pelidisi index, and Dreyer's assessment of physical fitness.

Pirquet's Index of Nutrition.—In contradistinction to the conception that energy exchange stands in definite relation to skin area, Pirquet of Vienna conceived the idea that the intestinal area, representing the surface which governs the amount of food absorbed, affords the proper basis for the determination of normal food requirements. In calculating the intestinal area, he used the observation made by Henning, in 1821, that the length of the intestine in centimeters is ten times the sitting height in centimeters, and, "as deduced from various observations on intestinal volume," that the width of the intestine is equal to one tenth of the sitting height, both measured in centimeters. On this basis, the area of the intestine is expressed as $10\ Si \times \frac{Si}{10} = Si.^2$

However, the food requirements of individuals differ widely, owing to many factors. In this connection, Pirquet worked out an index of nutrition based on the weight-sitting height ratio, the so-called pelidisi;

namely, ten times the weight in grams divided by the cube of the sitting height in centimeters. A well nourished child, according to Pirquet, will register 100 per cent. In the practical application of his system to the feeding of many thousand Austrian children by the American Relief Administration, all the children that registered 94 per cent. or less were considered undernounrished.

Furthermore, Pirquet does not rely on the weight-sitting height ratio alone in estimating the state of nutrition and the food requirements of individual children, but classifies them under four headings, according to the results of physical examination; namely, sanguis (blood); crassitudo (fat); turgor (water-contour); and muscularis (muscle).

Using the first consonants in each of these four words as a skeleton; namely, s, cr, t and m, and inserting after each of these symbols the proper vowel, "a," representing normal, "e" and "i," moderately and greatly increased, and "o" and "u," moderately and greatly decreased, respectively, Pirquet coined the word "sacratama" to indicate a child in normal nutrition. By substituting other vowels to form, for example, the word "socrotemo," this would indicate a slightly anemic, moderately thin, fairly rounded out child of moderate muscular development.

Pirquet's system is probably more useful in connection with feeding large groups of children. Serious objections have been offered to the application of the system to individual children, because it is based largely on theoretical premises.

In a comparison of "pelidisi" with percentages by the Wood tables, in a series of 984 Los Angeles schoolchildren, Faber [8] found that approximately one half of them would be graded as undernourished by the Pirquet scale, in comparison with one fifth and one ninth as 7 per cent. and 10 per cent. undernourished, respectively, by Wood's tables.

8. Faber, H. K.: The Pirquet System of Nutrition and Its Applicability to American Conditions, J. A. M. A. 77: 1837 (Dec. 3) 1921.

Representing the results of his study of these two scales by frequency graphs, Faber was able to show that, of the entire series of 984 cases, only 24.2 per cent. showed comparable indices of nutrition. Commenting on these findings, Faber declares that "from a statistical study of this sort, it is impossible to decide which method is at fault."

Dreyer's Assessment of Physical Fitness.—John Hutchinson, as far back as 1846, observed that patients suffering from pulmonary tuberculosis showed a lessened vital capacity. Inspired by Hutchinson's observation and stimulated by his experience during the World War, when vital capacity was made an important consideration in the selection of candidates for the British flying service, Georges Dreyer,[9] professor of pathology, Oxford University, made a series of intensive studies of carefully selected groups of persons, varying widely in age and physical development, and apparently he has been able to establish a definite relationship between vital capacity and certain body measurements, and to express the vital capacity as a function of these measurements.

According to Dreyer, when the weight in grams raised to the two-third power (or more accurately 0.72) is divided by the vital capacity, a normal constant for persons of the same class (occupation, mode of living, etc.) will be obtained, irrespective of age, weight or height. Some of his other formulas are as follows, V. C. being equal to vital capacity in cubic centimeters, N equal to 2, K equal to a constant, L equal to sitting height in centimeters, and Ch equal to chest circumference in centimeters:

$$\frac{L^2}{V.\ C.} = K^3$$

$$\frac{Ch^2}{V.\ C.} = K^4$$

$$\frac{L \times Ch}{V.\ C.} = K^5$$

9. Dreyer, Georges, and Ranson, G. T.: The Assessment of Physical Fitness, London, Cassell and Company, Limited, 1920.

By the use of these formulas, Dreyer has prepared a series of tables, for both males and females, of weight in relation to sitting height, chest circumference and vital capacity.

Weight is classified as: (1) possibly abnormal when it is found to be 5 per cent. above or below the calculated normal; (2) probably abnormal when it differs from the normal by 10 per cent., and (3) certainly abnormal when the deviation is as much as 15 per cent. from the normal calculated for a given sitting height, chest circumference or vital capacity.

Different persons, all apparently in good health, exhibit great differences in vital capacity, depending on the occupation and mode of life. This difference in normal persons, according to Dreyer, has nothing to do with fundamental bodily deficiencies, because it can be remedied by exercise and other measures.

I have long considered the sitting height a more reliable measurement than the standing height for determining physical standards, and I believe that Dreyer's methods and results should be carefully studied for comparison with the standards now in more or less general use in this country.

THE DUNFERMLINE NUTRITION SCALE

The Dunfermline scale, introduced by Dr. Alister MacKenzie of the Carnegie Dunfermline Trust, at Dunfermline, Scotland, distinguishes four nutritional groups on inspections:

1. "Excellent" means the nutrition of a healthy child of good social standing.
2. Children whose nutrition falls just short of this standard are classified as "good."
3. Children "requiring supervision" are on the borderland of serious impairment.
4. Children "requiring medical treatment" are those whose nutrition is seriously impaired.

The use of this scale presupposes medical training and experience. Following are some of the compara-

tive results of the application of this scale by medical officers of the U. S. Public Health Service, modified as to terminology, to 9,973 schoolchildren, largely of Anglo-Saxon stock, residing in Delaware, Maryland, New York, South Carolina and Virginia.

1. The percentage of defective nutrition in children classified according to clinical evidence other than weight was highest at 8 years of age, decreasing with age, as shown in Table 3.

2. From the fact that the mean measurements of the children classified as of fair or of poor nutrition were constantly less than those classified as of good or of

TABLE 3.—PERCENTAGES OF 9,973 CHILDREN CLASSED AS OF FAIR, OR OF POOR NUTRITION

Age	Both Sexes	Boys	Girls
6	17.6	18.6	16.6
7	19.9	20.1	19.6
8	20.7	22.1	19.2
9	18.8	18.0	19.6
10	18.0	17.1	19.1
11	18.9	19.0	18.9
12	15.1	16.4	13.9
13	12.8	13.1	12.5
14	12.4	11.7	13.0
15	9.0	12.3	5.7
16	7.1	8.4	6.2

excellent nutrition, the children classified as malnourished from clinical evidence other than height and weight, are shorter and lighter, and have a smaller weight-height index.

3. Differences in height are much less significant in judging nutrition than in judging differences in weight.

4. In comparing the percentage distribution of the two groups classified as of good or of poor nutrition, according to clinical evidence other than height and weight, it is found that, while on the average the children in the latter group weigh less than those in the former, some of the children in the poor group weigh more than some of the children in the good group. This is additional evidence that weight measurements alone are not sufficient for determining nutrition, but that these must be supplemented by medical examinations.

PROPOSED STUDY OF PHYSICAL STANDARDS BY U. S. PUBLIC HEALTH SERVICE

The Public Health Service is now making some careful studies of the physical development of schoolchildren in cooperation with the divisions of child hygiene of several state boards of health. It is purposed to extend these studies and to secure the cooperation of other state and municipal boards of health, in order that special measurements may be obtained of selected classes of children residing in both urban and rural communities, in sections of the country more or less homogeneous in population and subjected to practically the same climatic conditions.

The measurements will be made in the case of certain racial groups; namely, children who may be considered of native American stock, native born children of foreign born parents, according to race stock, and of foreign born children, according to race stock. They will be made in identically the same manner, with instruments that have been standardized, and recorded on a special form. The special measurements will be used in calculating standards for comparison with those already in use, both in this country and elsewhere, and as the basis of standards applicable, if not to the country as a whole, at least to the different sections of the country from which the data were obtained. In fact, it is a question in my mind whether we can hope to adopt a standard which will be applicable to the country as a whole, owing to the effect of the wide geographic distribution of our population whose various elements are thus subjected to varied climatic influences and, therefore, different food supplies; and also because of the impress which necessarily must have been made on physical development by the tremendous alien immigration to which this country has been subjected in the last twenty or more years.

RELATION OF PHYSICAL DEFECTS TO UNDERWEIGHT

During the present scholastic year, one or more physical defects were noted in 74.9 per cent. of 8,887

schoolchildren in Detroit who were 15 per cent. or more underweight. No outstanding defect was observed in 25.1 per cent. of them.[5]

The reported percentages of defects found in greatest frequency were: enlarged or infected tonsils, 50.8 per cent.; defective teeth, 22.7 per cent.; faulty vision, 9.3 per cent.; mouth breathing, 9.2 per cent.

A comparison of gain in weight by children without nasalpharyngeal obstruction and those recommended for operation in a study made by the bureau of educational experiments, New York City [10] showed that 68.87 per cent. of thirty-two children without this defect made gains in excess of the normal, as compared with 55.1 per cent. of those without correction. In comparing the relative gain, however, only 6.1 per cent. of those having defects showed over 100 per cent. gain in excess of the normal, as compared with 31.3 per cent. for those without defects.

In April, 1920, a study of 200 underweight Baltimore schoolchildren from 7 to 14 years of age was made by officers of the U. S. Public Health Service, to determine the effect of the removal of physical defects on the rate of growth as represented by height and weight.[11] These children were exempted from nutrition instruction and from any special hygiene other than the correction of their physical defects. The higher percentage of monthly increase in weight noted may be largely, if not wholly, attributed to the correction of the physical defect.

It was found that the percentage monthly increase in the weight of boys and girls from 7 to 10 years of age was 0.47 per cent. and 0.27 per cent., respectively, before the operation for diseased tonsils and adenoids, as compared with 1.80 per cent. and 2.05 per cent. after the operation. In the case of children from 11 to 14 years of age, the percentage of increase was 0.47 per

10. Health Education and the Nutrition Class, a report of the Bureau of Educational Experiments, New York, p. 57.

11. Correcting Physical Defects in School Children, Pub. Health Rep. 37, No. 15 (April 21) 1922.

cent. and 0.84 per cent., respectively, before the operation and 2.04 per cent. and 1.99 per cent. after the operation. It is safe to assume that underweight in the case of these children was due largely to toxic absorption rather than to improper feeding. Expected percentage increase per month in weight computed from tables of average weights is presented in Table 4.

TABLE 4.—EXPECTED PERCENTAGE INCREASE PER MONTH IN WEIGHT COMPUTED FROM TABLES OF AVERAGE WEIGHTS

Tables	Age	Boys	Girls
Emerson	7 to 10 years	0.78	0.77
U. S. P. H. S.	7 to 10 years	0.72	0.79
Emerson	11 to 14 years	0.88	0.97
U. S. P. H. S.	11 to 14 years	0.82	0.97

TENDENCY OF STAPLE CROPS TO MODIFY NUTRITION

It is doubtful that more than a few children in this country are undernourished because of too little food.

According to McCollum,[12] "low vitality, low resistance and inefficiency, and a tendency to cumulative fatigue" result from adherence to a faulty diet, and a diet of cereals, tubers and muscle-tissue meats is inadequate. Furthermore, the cereal grains, which are incomplete foods, are coming into more extended use because of the tendency of farmers, owing to ease of production and probable relative low cost of production, to plant larger and larger acreage to these grains, which are so materially reduced in nutritive value by faulty milling. It is necessary to supplement the bread, meat and potato diet with milk and green leafy vegetables in order to supply mineral and accessory food factor deficiencies. In actual practice, however, the application of this thoroughly sound knowledge will be followed by failure unless at the same time other causes of malnutrition are looked for, considered and

12. McCollum, E. V.; Simmonds, N., and Parsons, H. T.: Supplementary Protein Values in Foods, J. Biol. Chem. **47**: 111, 139, 175, 207, 235 (June) 1921.

controlled. Of what avail is it to advise the underweight schoolchild to use milk when there is no milk? or to prescribe the leafy vegetables when the cereal grains and cotton form the staple crops in large areas of our country, even to the exclusion of products of the garden plot? Here nutrition becomes a matter of general education and of change in community custom and habit, involving time; and of state and federal guidance. It is not merely a question of weighing and measuring.

NUTRITION WORK IN RELATION TO REGULAR SCHOOL ROUTINE

So serious are the demands made on the time of both pupils and teachers by those engaged in or wishing to engage in sundry forms of welfare work, and by others with newly devised schemes for the general uplift which they wish first to try out in the schools, that any great extension of such activities, it seems, will leave but little time for instruction in the three R's. It is for this reason, all basically related forms of school health work should be united and harmoniously fitted to the general plan of health instruction and health supervision, utilizing the combined wisdom of both the educational and health authorities for such purpose.

Courses in health should be prescribed and given weight in the school curriculum corresponding to major subjects. Such instruction naturally should be adapted to the intellectual capacity of the different age groups. As regards nutrition, teaching in the early grades should be concerned more with the importance of milk, vegetables, fruits, cereals and the like, in the diet, from the standpoint that they help to make the child grow up to be strong. The teaching of the principles of nutrition and nutritive values should be reserved for the older grades.

Instruction in nutrition should not be reserved for and given only to a special group of children, either

underweight or otherwise, but should include all children attending school, else we shall not find succeeding generations attaining the best possible physical development. Such instruction is necessary for the guidance of the potential parents of future generations, and to overcome the ignorance now so commonly observed concerning these principles and values.

Special nutrition classes for malnourished children are unnecessary in a well conducted school system providing proper health supervision. Children judged to be undernourished, by whatever standard, are candidates for open air classes and open air schools, where everything possible may be done to restore them to normal, including supplementary feeding, examination for and correction of physical defects, special instruction and graduated exercises, rest periods and a follow-up system reaching into the homes.

Weighing and measuring should be considered a necessary measure in every physical examination, and, in the case of children who fail to gain or lose weight steadily, the causes should be investigated and corrected.

The character of the school lunch should receive careful attention, especially in rural schools, where many children frequently come long distances after a hurried breakfast, bringing a hastily prepared, poorly selected lunch, or none at all, and remain all day. Aside from the question of the effect on health, an underfed child is no more fit for mental effort than is the laborer for physical tasks.

I do not wish to convey the impression that I can find no good in the nutrition work now being done by so many earnest, and, at times, inexperienced workers, because, for the most part, the measures recommended by them, if carried out, will be helpful in overcoming defective nutrition, no matter what may be the underlying cause. Furthermore, their persistent activities have served a very useful purpose in stimulating thought and action by those in positions of responsi-

bility and qualified by training and experience to advise in such matters. Among the objections to unsupervised and indiscriminate nutrition work may be mentioned:

1. The tendency of the popular fancy to make a fad of a serious problem.

2. The danger that the enthusiasm of untrained workers will cause them to lose sight of the fact that nutrition and its opposite are medical problems requiring the best obtainable medical advice in individual cases.

3. The creation of a false sense of security in the mind of the parents of underweight children, by the temporary improvement following the application of well known principles of hygiene to ailing children, with potential diastrous after-effects, unless the treatment provided is based on medical advice.

CONCLUSION

I wish to emphasize that, in calling attention to the need of proper supervision of lay and nursing workers in nutrition, I must also call attention to the apathetic, and in many instances, indifferent attitude of the medical profession to the danger signals that have been so prominently brought to the front by the lay workers, and urge the importance of physicians' displaying more active interest in nutritional problems and giving more hearty support and cooperation in solving them.

ABSTRACT OF DISCUSSION

Dr. Borden S. Veeder, St. Louis: Every pediatrician has reached the point of view that malnutrition is an individual problem and not a group problem. There are a number of causes for malnutrition, among which may be mentioned physical defects, economic conditions, the environment of the child, and health habits. If you take a group of malnourished children, you will find one who has cardiac disease; a second with hyperthyroidism; a third who does not have the proper amount of sleep; a fourth who does not get the proper amount or, perhaps, the proper kind of food, and so on. In other words, in nearly every case of malnutrition, there is some one or more causes, and consequently malnutrition cannot be looked on or treated as a disease, but must be regarded as a symptom which may be produced by a number of causes. In order to understand an individual case properly, it must be studied from all sides, not only the physical but the environmental. The physician who sits in his office and tries to treat malnutrition by physial examination of the child alone, with-

out entering into the life and habits and environment of the child, will not get very far, nor will the nutritional worker who tries to treat malnutrition by diet without understanding the physical background. If one tries to reach the malnourished children in groups, each group must be small, so that the individual child can be studied. I think that the study of malnutrition has led us all to the conclusion that one of the chief factors is overfatigue. The child who does not get enough rest, whether it is from lack of sleep, or from overexcitement, overwork or something that has to do with its habits, is not a healthy child and is usually malnourished, whether or not there are any physical defects present. The unfortunate thing about the subject of malnutrition is that it has been made a fad, and a good deal of the malnutrition which is said to exist in many of our schools, as a result of weighing children, is actually nonexistent. We find that malnutrition is more common in the lower grades than in the higher grades, although no efforts have been made at all to correct conditions. If one leaves a large percentage of the malnourished children alone for a year or so, a very large number of them will seemingly get well, no matter how one treats them. Although the amount of attention and notoriety that has centered about undernourished children and malnutrition in the last few years has probably done a lot of good by calling attention to the physical condition of the child, still it is my feeling and, I know, the feeling of many pediatricians, that a grave mistake has been made by a great many persons in regarding it as a group problem rather than a problem of the individual.

Dr. John Dill Robertson, Chicago: Lafcadio Hearn said years ago: "God never repeats His work." An individual once removed will never return or be duplicated through the eternity of eternities. In other words, no two individuals, even in the same family, are exactly alike. This being the case, it is difficult to make standards for the purpose of determination of so-called malnutrition. The condition cannot be determined by the same standards. In other words, we have no proper standard for easy determination of the condition of nutrition. By use of the yard stick, the age and the scale, thousands of children throughout America have been labeled as suffering from malnutrition without the history of their forebears being taken into consideration. In the majority of instances, a child follows the hereditary course of one or more of his ancestors. There is undoubtedly much malnutrition. This can be determined only by careful physical examination by an expert physician who is qualified to check up not only his digestive, respiratory and nervous systems, but every other system of his body. This cannot be done in the school, for it is necessary to check up on the blood and urine, and to make other laboratory tests. To say that a child is underweight and therefore must be fattened up, with-

out a thorough examination, is to grope in the dark. Would it not be better to investigate heart, lungs, kidney capacity, etc., before advising Willie to put on a few more pounds, which will require more blood vessels perhaps, than heart can accommodate, perhaps more tissue than the excretory organs can care for ? The so-called nutrition clinics in our public schools, during the last three or four years, have run the course of all fads, and, like every other fad, will disappear and be replaced by a sane program. This program cannot be carried out by nurses or by physicians not specially trained. In other words, the grocery clerk system of weighing, aging and measuring must be abandoned for one conducted by trained medical men.

Dr. Allen J. Hruby, Chicago: The fad of the nutritional clinic has run its course in the public schools of Chicago, under the supervision of teachers and club women. Our work in the Municipal Tuberculosis Sanitarium has shown us that some very careful work is necessary before we can adopt any standard. Dr. Grace S. Wightman, with a committee of dispensary physicians, was selected to take charge of a group of schools, to see whether they could adopt a standard for nutrition by a careful anthropologic study of the children. The final conclusion is that a careful clinical history and physical examination must be made, together with a study of the economic and sociological conditions; also a complete laboratory examination and an investigation of the condition of the internal secretions, before any conclusions can be arrived at. We have concluded in Chicago that all these points must be taken into consideration before we can make a diagnosis of malnutrition.

Dr. W. L. Holt, Knovxille, Tenn.: I have been much interested in this problem of malnutrition in the South. One of the things I noticed was the shortage of milk. I take 6 quarts of milk in my own family, so that as a health officer I practice what I preach. I found a great deal of malnutrition in Knoxville. In one school in the poor district not less than 28 per cent. of all children were 10 per cent. or more underweight; and we found a great difference between the boys and the girls, 18 per cent. of the boys and 35 per cent. of the girls being 10 per cent. or more underweight. That is one thing I am particularly interested in, and I should like to ask Dr. Clark or any one else what his explanation is regarding this difference in percentage between boys and girls. I also want to ask Dr. Clark what a reasonable amount of milk is for the average schoolchild. I believe that a quart is reasonable, but some men think a pint and a half.

Dr. Isaac D. Rawlings, Springfield, Ill.: I have been much interested in this paper because in Illinois we have felt that when weighing and measuring of schoolchildren is done without any physical examination, this procedure is more or less of a fad. We have been really concerned over the pos-

sibility of doing harm by labeling children as sufferers from malnutrition, and giving them milk that is not made safe by pasteurization. In 1911 we passed a law that no municipality could require tuberculin testing of the cattle supplying milk to the municipality, so we have no testing of tuberculous cattle except by virtue of the accredited herd act. I have found by consulting the newspaper clippings that the various clubs throughout Illinois have organized a plan of weighing and measuring children and have then fed these children. I understand that the milk is often not pasteurized, and I am afraid that it is not safe and that the children are really in danger from it. As to their physical condition and the need of food, it seems to me that this feeding is ill advised unless measures are taken to see that pasteurized milk is supplied when it is necessary to feed these children. If it cannot be obtained, commercially pasteurized, some method should be instituted whereby it is pasteurized at home or at school before being given to the children.

Dr. Florence Meredith, Philadelphia.: In Philadelphia, and perhaps everywhere, there is a tendency to overemphasize what may be done by merely weighing and measuring children and increasing the caloric intake. Malnutrition is a medical diagnosis, often most difficult for the physician to make. Weight offers only one diagnostic point: increasing the number of calories is only one remedial measure. The technic of the lay nutrition worker, valuable as it is, should be supplementary to thorough medical work wherever possible. Ideally, each case of malnutrition should be handled individually as to diagnosis and treatment. The nutrition class has met a certain need, because of the large number of children to be dealt with. But it is certainly not possible to do as good work with a group as with individuals. The sooner we are able to treat malnutrition as a medical problem and an individual problem, the better. All honor to those who have been successful with the class method, however. For a long time yet it will be the only possible method of dealing with a great deal of the malnutrition.

Dr. James Stewart, St. Louis.: I cannot say that I regard the question of nutrition and the selection of children supposedly suffering from malnutrition as being entirely a fad. In St. Louis, we have established a very efficient and conservative system. We felt that the question of nutrition should not be in the hands of the teachers or school principals. We believe that weighing or measuring of children should be entirely in the hands of the school physician or school nurse. We were fortunate in having a demonstration carried on by the Pubic Health Service in St. Louis a few years ago, and through that experiment we gained information that was so satisfactory that the board of education asked us to continue the work. The school hygiene division asked that a college course in nutrition, of two credits, be given to all school nurses. This has been completed within the last few

weeks. We selected a group of children in the open-air schools, who were put on a regular routine of diet and health habits. Those who were found to be physically impaired had their defects corrected and the home surroundings improved by conferences with the father or mother or the one responsible for the child. With that cooperation, we believe that the work has been well done. It is our object that all school systems throughout the land will leave that work in the hands of the school physician or the school nurse, because, with the experience of the physician and the nurse, these children will be brought up to the proper standard, and because of the child's improved physical condition he will be able to go through school and graduate with less effort, possibly, on the part of the teacher and of himself. That is an economic advantage that should be recognized. In our open-air schools, the number of undernourished children and of cases of contagious diseases has been very low as compared with the regular elementary schools. That shows what these health habits and the building up of the child suffering from malnutrition accomplish when children are brought up to a special standard and their resistance has been increased to such an extent that contagious disease in these schools is practically nil.

Dr. Taliaferro Clark, Washington, D. C.: The object of my paper is not merely to call attention to nutrition work by untrained agents, but to sound a warning that they must not let their enthusiasm run away with them to the extent that they lose sight of the fact that malnutrition is a health problem. On the other hand, I must also sound a warning to those in authority and to practicing physicians that unless they wake up and take notice of underweight as a danger signal, the lay workers are going to continue this work unsupervised and with potential unhappy results. In regard to standards of physical development, I believe that it will be rather difficult to accept or adopt a standard that would be applicable to every child in every part of the country. Many factors must be considered in the preparation of such a standard. The Public Health Service at present is beginning a nation-wide study of the physical development of children that takes into consideration numerous factors bearing directly on this problem. One of the first steps considered was the standardization of the apparatus to be employed, so that measurements made by different persons in widely separated communities would be exactly comparable. Incidentally, it was found that the accuracy of scales and other forms of anthropometric apparatus varied greatly. This serves to call attention to the possibility of serious error in judging the state of nutrition, not only because of the selection of an arbitrary standard of deviation from the normal to represent underweight, but also because the instruments themselves, unless carefully standardized, may vary to the extent represented by such arbitrary standard.

THE SHEPPARD-TOWNER ACT IN RELATION TO PUBLIC HEALTH

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National recognition of the need for the health protection of motherhood and infancy became a reality in November, 1921, with the enactment of the Sheppard-Towner Act, known as an act for the promotion of the welfare and hygiene of maternity and infancy.

HISTORY

The legislative history of this measure is noteworthy for its brevity. The original bill was introduced in the Sixty-Fifth Congress and was reported favorably following two hearings before the House Committee on Labor in January, 1919. An amended bill was introduced in the Sixty-Sixth Congress in 1919. This bill provided that the state administration should be through child hygiene or child welfare divisions in state boards of health. Hearings were held before the Senate Committee on Public Health and National Quarantine, and the bill was reported out of committee practically unchanged.

The Senate acted favorably upon the bill after cutting the appropriation to $1,480,000 annually and substituting for control, by an interdepartmental board, administration by the Children's Bureau, with an advisory board consisting of the Surgeon General of the U. S. Public Health Service, the Secretary of Agriculture, and the Commissioner of Education. After hearings, the House Committee on Interstate and Foreign Commerce reported the bill favorably, con-

curring with the Senate amendments. The measure was not brought up in the House during this session.

In 1921 the bill was reintroduced into the Sixty-Seventh Congress in the form in which it had been passed in the Senate in the preceding Congress. Following a favorable report by the Committee on Education and Labor, the Senate passed the measure in July by a vote of 63 to 7.

The House Committee on Interstate and Foreign Commerce, after extensive hearings in July and protracted deliberations until November, unanimously reported out a redrafted bill, practically in the form in which it finally became a law. The House vote on the measure stood 279 to 39. The President signed the act, Nov. 23, 1921.

The most important changes in the bill as it was finally passed were with regard to the title, appropriations and the federal board.

The title was changed to "An act for the promotion of the welfare and hygiene of maternity and infancy and for other purposes."

Probably the most important change made was the fixing of a five-year limit on the authorized appropriation after the present fiscal year.

The Sheppard-Towner act provides for the current fiscal year (1922) $10,000 for each state accepting the provisions of the act, and an additional sum of $1,000,000. Of this additional amount, not more than $50,000 is to be used for federal administration, and the remainder is to be apportioned to the states and granted if matched dollar for dollar by state appropriations—$5,000 to each state, the remainder to be apportioned on the basis of population.

After the present fiscal year the authorized annual expenditure is $5,000 unmatched to each state and, to be matched dollar for dollar, an additional $5,000 plus a prorated amount of the remaining $710,000 of the additional $1,000,000, after a maximum of $50,000 has been deducted for federal administration.

The federal board was changed from a board advisory to the Children's Bureau to the Federal Board of Maternity and Infant Hygiene, composed of the chief of the Children's Bureau, the Surgeon General of the U. S. Public Health Service, and the Commissioner of Education. The board is given authority to approve or disapprove the plans submitted by the state, and to withhold further certification of the federal funds to a state if the money is not properly expended.

While certain desirable but minor provisions of the act have been omitted, and a few new stipulations added, the original purpose of the bill remains unchanged in that provision is made for federal aid to the states, administered through the Children's Bureau, for the purpose of reducing the maternal and infant mortality and protecting the health of mothers and infants, the states having complete authority to initiate plans for approval by the federal board.

NEED AND AIMS

This bill was the direct outgrowth of the series of investigations on maternal and infant mortality made by the federal Children's Bureau during the nine years of its existence. These investigations, besides dealing with the social, economic, industrial and civic conditions surrounding mothers and infants, reveal a morbidity and a mortality which, authorities agree, are to a great extent preventable.

The need for public protection of maternity and infancy, revealed by the reports of the bureau, has recently received confirmation in the report of Dr. William Travis Howard [1] of the Johns Hopkins School of Hygiene. He summarizes thus:

> The relatively highly developed knowledge concerning practical obstetrics is so meagerly diffused and so ineffectively applied to practice, that certainly in the registration

1. Howard, W. T., Jr.: Real Risk-Rate of Death to Mothers from Causes Connected with Childbirth, Am. J. Hyg. 1: 197 (March) 1917.

area of the United States it is not brought to bear with sufficient force to prevent the occurrence of innumerable major and minor illnesses and a large number of unnecessary maternal deaths.

PRESENT STATUS OF THE ACT

Anticipating the enactment of the maternity and infancy bill, six legislative acceptances were effected prior to its final passage. One of these acceptances was good only in case the pending federal act was passed without change, and another was technically inadequate. One state accepted the act at a special session of the legislature in 1921. Of the eleven state legislatures having regular sessions in 1922, seven have accepted the act, and four—Louisiana, Massachusetts, New York and Rhode Island—did not accept its benefits. Hence, to date, a total of twelve states have accepted through legislative action. The New York legislature, though refusing to accept the act on the ground of paternalism, increased by $130,000 its previous child hygiene appropriation of $30,000 and created a division of maternity and infancy. Such action demonstrates the desirable stimulation which may be effected through federal aid.

Provisional acceptances of the act have been received from the governors of thirty states, pending the next regular sessions of their legislatures.

The funds authorized by the act did not become available until late in March. The federal board at its first two meetings, April 18 and May 5, approved plans submitted by thirty-three states. In order that actual state work might begin at as early a date as possible, these initial plans were approved along very broad and flexible lines, attention being called to the fact that such action did not establish a precedent as to future plans. The scope of the activities contemplated varied in each state according to local conditions, and was dependent on previous local developments in the field of child hygiene.

Such general, but nevertheless fundamental, projects of maternal and child hygiene as accurate birth registration, improved milk supplies, and state surveys of the medical and nursing facilities for maternal and infant care, appeared frequently in submitted plans. These were approved in the initial plans because of the realization that gradual readjustments are necessary in forward-looking programs which eventually will concentrate on the problems more specifically concerned with maternity and infancy. Unprecedented attention to the registration of midwives, as well as to their training and supervision, is contemplated in many states in which previously this problem has been entirely ignored. In states with well-organized child hygiene divisions, where the necessary pioneer stage has been passed, the increase in the numbers of county or community public health nurses whose duties are to be extended to include surveys of facilities for maternity care, and prenatal and postnatal instruction either in classes or in the home, promises marked strides toward the end to be attained. State and district supervisory prenatal nurses are in several states an innovation which will promote uniform educational standards and technic.

SPECIAL PROBLEMS ON WHICH ATTENTION SHOULD BE FOCUSED

Mortality rates, both maternal and infant, are probably our most reliable indexes of progress in raising general health standards. In 1915 the infant mortality rate in the United States birth registration area was 100 per thousand births and the maternal mortality rate 6.1. In 1920 the infant mortality rate had fallen to 85.8, but the maternal death rate was 8. The total number of maternal deaths in the death registration area in 1920 was 16,776.

While the infant mortality rate shows a satisfactory gradual decline during this period, with substantial decreases in deaths from the causes classified in the

gastro-intestinal and respiratory groups, the mortality rates in the early infancy group, including deaths caused by premature birth, congenital debility and injuries at birth, show no substantial reduction. In the year 1915 the number of infant deaths during the first month of life was more than five times that of the last three months, and in 1920 it was still five times as

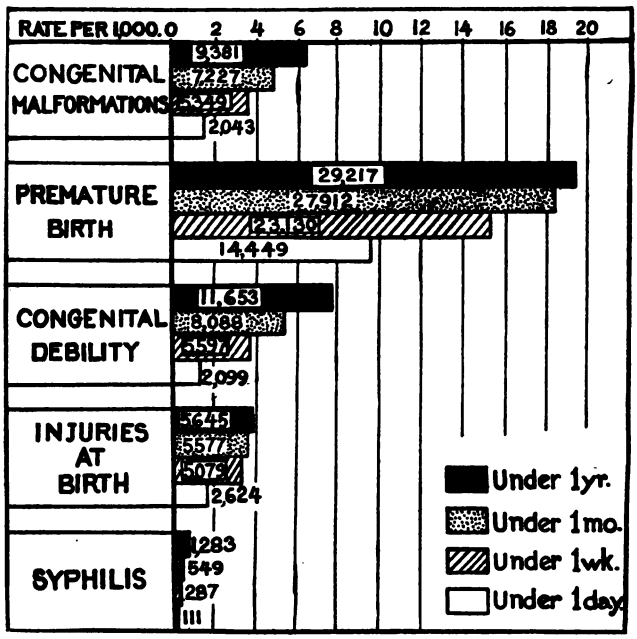

Chart 1.—Infant mortality from natal and prenatal causes in birth registration area, 1920.

great. Similarly, in the year 1915, the number of infant deaths during the first week of life was eight times that in the fourth week, and in 1920 it was nine times as great.

The greater part of these neonatal deaths are due to natal and prenatal causes, as shown in Chart 1.

In the study of state statistics, it is most illuminating to note the number of these early infant deaths for which no medical attendant is reported. Apparently

the lack of recognition of the need for medical attention at this period corresponds somewhat to the lack of knowledge of the need and value of prenatal care for the mother.

The figures just given minimize the actual mortality rates, since stillbirths are not included. The inclusion of the records of stillbirths and their causes is important and highly relevant if adequate information is to be obtained as to the relation of prenatal and natal conditions to infant mortality. According to Census Bureau reports for 1918, the number of stillbirths recorded for the birth registration area, exclusive of three states and one city, was 48,634.

There is no uniformity of definition or reporting in the various states with reference to the period of gestation which determines whether a child is stillborn. The model vital statistics law requires that separate certificates of birth and death shall be filed for a fetus which has advanced beyond the fourth month of uterogestation. While at present the standard birth and death certificate forms have been generally adopted, birth registration in only twenty-nine states and death registration in only thirty-seven states are sufficiently complete to entitle them to admission to the United States registration areas.

Maternal mortality rates show no improvement since 1900. The dominant cause of maternal mortality is puerperal septicemia, a condition known to be largely preventable. This means that modern knowledge of the causes and prevention of infection, as successfully applied to surgical practice, has not been applied to obstetric practice so effectively.

State supervision, through inspection and licensing of so-called maternity homes and institutions caring for infants, though generally recognized as essential, has to date received little effective attention, and offers a fruitful field for study of the problems connected with the hygiene of maternity and infancy.

A consideration of the information available in this country at present concerning midwives makes it apparent that one of the most important steps in the program for bettering conditions surrounding maternal care is an investigation to determine the actual numbers and qualifications of midwives throughout the country. This would logically be followed by the adoption of a policy for either training, licensing and supervising midwives, or providing adequate medical substitutes for them. The 1920 occupational report of the Census Bureau lists 4,473 midwives in this country; yet, as the result

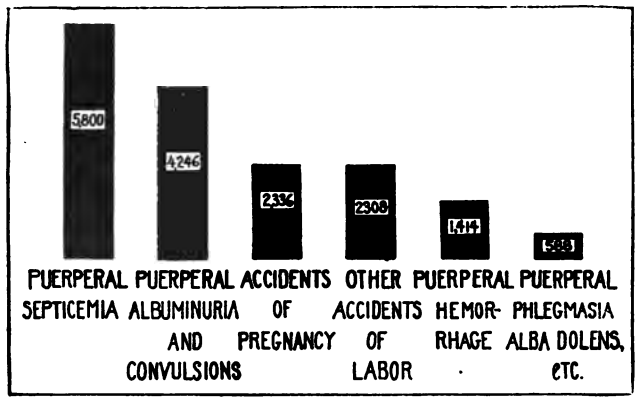

Chart 2.—Maternal mortality by cause of death, birth registration area, 1920.

of a questionnaire sent out by the Children's Bureau in 1919, the number of midwives in each of a number of states was estimated as ranging from 1,000 to 7,000. In New York City alone in 1919 there were 1,612 midwives licensed and practicing.

In a statement made by Dr. Nicholson,[2] in 1921, he summarizes the information obtained through a questionnaire which he sent to the health officers of every state in the United States. "As far as can be judged from the replies received," he says, "New York (33

2. Nicholson, W. R.: An Anachronism of the Twentieth Century, the Midwife, Nathan Lewis Hatfield Lectures delivered before the College of Physicians of Philadelphia, Lecture III, Feb. 18, 1921.

per cent. delivered by midwives in New York City), New Jersey, Connecticut and Pennsylvania are the only states at present attempting any real control of the midwife." Although a license to practice is necessary in twenty states, this so-called licensing is farcical in the great majority of instances, for several states, with considerable percentages of midwife deliveries, frankly admit that the midwifery law is not enforceable. The author points out that, in some states in which the percentage of midwife deliveries is very high, the control is in the hands of county officers and that nothing less than state control is really efficient in meeting the midwife situation.

The statement further cites conditions in states such as Kentucky, with 2,500 midwives, who are untrained and who deliver 20 per cent. of the babies in the state; and Virginia, with 7,000 midwives, untrained, who deliver 40 per cent. in the general population and 29 per cent. in the city of Richmond. Leaving out of consideration states in which the problem is evidently not a pressing one, Dr. Nicholson is doubtful whether any of the states requiring licenses for midwives exercise real control in any degree.

The extent of the problem of midwifery—the term being used in its broadest sense—is shown by what one state faces in its Sheppard-Towner plans with 6,000 midwives, 3,000 physicians and between 60,000 and 70,000 births annually.

That the training, licensing and careful supervision of midwives is one method of attack on the problem has been demonstrated in a few communities in this country and in England.

Dr. S. Josephine Baker [3] writes:

This satisfactory reduction of the maternal death rate from puerperal diseases in New York City (the rate for 1919 being 11.41 per 10,000 labors, as compared with 14.41, which is the combined rate for five years 1915 to 1919, inclusive) is

3. Baker, S. J.: Report of Status of Maternal Mortality in New York City (prepared at the suggestion of Senate Committee on Education and Labor).

believed by the department of health to be due to the administrative measures which have been carried out for the better protection of women during the puerperal period, and for raising the standards of obstetrics as practiced by midwives. Measures of this type have been carried out in New York City for the last twelve years and are considered by the department to be essential in any well-rounded public health program.

Control of the practice of midwifery in New York City includes refusal to issue a license to any midwife who had not practiced in the city prior to 1907 unless she is a graduate of the Bellevue Hospital School for Midwives, which is maintained by the city of New York and has an eight-months course of instruction, or unless she is a graduate of an accredited European school of equal or higher standing. In addition, the Bureau of Child Hygiene carries on a systematic and widespread supervision of the practice of these women who, at the present time, report about 37 per cent. of all births. It can hardly be claimed that the general type of obstetric practice by physicians and the conduct of the lying-in hospitals of New York City are on a higher plane than obtains in Baltimore, Philadelphia or Boston. While there is no question that an advance in obstetric practice has been noticeable in the last decade, the fact still remains that New York is the only one of the cities of the United States mentioned in this report which has instituted and maintained a vigorous and far-reaching control of the practice of midwives. This department believes that it is reasonable to infer that these administrative measures have been a prominent factor in the reduction of the death rate from puerperal diseases.

The second annual report of the Ministry of Health of Great Britain for 1920-1921 states that "midwives now attend the majority of births in England and Wales. In 1919 . . . the percentage of births notified by midwives was 51 in London and 69 in the county boroughs." Midwives in England have been trained and licensed since the Midwives Act became a law in 1902. Between 1902 and 1914, the maternal mortality from puerperal septic diseases in England and Wales has decreased from 118 to 75 per million female population.[4]

The fundamental importance of accurate birth registration scarcely needs comment; but it is interesting

4. Carnegie United Kingdom Trust: Physical Welfare of Mothers and Children, England and Wales 1: 30, 1917.

to note that the Sheppard-Towner Act seems to have given new impetus to the interest in the subject, and many states include in their plans provision for more effective registration of births.

One phase of birth registration which is especially important in connection with the reduction of the early infant mortality rate, and also in connection with the prevention of ophthalmia neonatorum, is the question of the time which is allowed to elapse between the birth and its registration. Chart 2, giving the time at which births are reported in the various states, indicates that fourteen of the states within the birth registration area do not require the reporting of births early enough to make it of value in the prevention of ophthalmia neonatorum. According to present accepted standards of successful infant care, the early reporting of births is essential, not only in the prevention of blindness but also in instituting proper care as soon after birth as possible, and in establishing breast feeding, etc. The importance of the early reporting of births is strongly indicated by the fact that in the United States death registration area in 1920, one third of all the deaths of infants less than 1 year of age occurred in the first week of life.

The period within which the reporting of births is required varies in the different states. The state laws and regulations specify:

Twenty-four hours in Delaware.

Thirty-six hours in California and Indiana.

Forty-eight hours in Massachusetts and Rhode Island.

Three days in North Dakota.

Four days in Maryland.

Five days in Arizona, Michigan, New Jersey, New York, North Carolina, Texas and Wisconsin.

Six days in Maine and New Hampshire.

Ten days in Alabama, Arkansas, Colorado, Connecticut, Florida, Georgia, Idaho, Illinois, Iowa, Kansas, Kentucky, Louisiana, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Mexico, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, Tennessee, Utah, Vermont, Virginia, Washington, West Virginia and Wyoming.

Thirty days in South Dakota.

The states that are not in the birth registration area are Alabama, Arizona, Arkansas, Colorado, Florida, Georgia, Idaho, Illinois, Iowa, Louisiana, Missouri, Nevada, New Mexico, North Dakota, Oklahoma, South Dakota, Tennessee, Texas and West Virginia.

Postal notification, with certificate in ten days, is required in Delaware and Massachusetts.

In Montana the law states that if the birth is reported within ten days the person reporting is entitled to a fee.

The availability of hospital facilities for maternity care is a very vital problem, as it is an admitted fact at the present time that the hospital is a necessary adjunct, at least for the abnormal obstetric case, and that it is often safest for the normal case, especially for a primipara.

The situation with regard to hospital facilities for maternity care in this country is very interesting. In 1921 a questionnaire was sent by the federal Children's Bureau to every hospital in the United States of which the name and address could be obtained, in order to determine the adequacy of present hospital facilities for maternity care. While replies were received from only 76 per cent. of the hospitals circularized, the figures are interesting and significant.

Of the 3,497 hospitals reporting, 2,645 admitted maternity cases in 1920. Of these, ninety-seven were exclusively maternity hospitals and 2,548 were general hospitals. The total number of hospitals reporting by state as admitting maternity cases varied from four in Delaware to 198 in New York. Fifteen states reported no exclusive maternity hospitals. One state reported as many as ten. A total of 27,405 beds was reported available in the 2,645 hospitals. For the year 1920, 2,575 hospitals reported 323,175 confinements. If one computes hospital capacity for confinements on the basis of twenty-six patients to one bed each year, allowing two weeks' hospital stay for each patient, the number of possible confinements in hospitals in the United States in 1920 was 712,530. This

is more than twice the number of confinements which actually took place in the hospitals reporting.

On the basis of these figures it is estimated that approximately 13.6 per cent. of the total births during the year 1920 occurred in hospitals. This percentage varied from 1.7 in Arkansas and Mississippi, to 40.1 in Illinois. Though these figures are only approximate, because of the admitted limitations of the questionnaire method, they at least point significantly to several phases of the hospital problem in relation to obstetrics. They show that there is hospital provision for approximately 40 per cent. of the births in the United States, but that only 14 per cent. of the births during 1920 occurred in hospitals. In this lack of utilization of available hospital facilities for confinement care are involved three important problems: (1) cost of hospital care; (2) inaccessibility of hospitals, and (3) lack of knowledge concerning the advisability of hospital care.

Many other equally important problems await solution in connection with the hygiene of maternity and infancy. The Sheppard-Towner Act authorizes an appropriation for a five-year period. Its fundamental purpose is to enable states to demonstrate for themselves the value of such work in terms of life saving and improved health, and to stimulate them to develop more complete programs for making such work effective. It is apparent that the protection of maternity and infancy is not the function of one isolated group, but is dependent on the obstetrician, the pediatrician, the general practitioner, the public health nurse and the social worker in cooperation with the public health authorities. In addition, it is dependent on the cooperation of an enlightened public.

ABSTRACT OF DISCUSSION

Dr. Mary Riggs Noble, Harrisburg, Pa.: In the baby work in Pennsylvania, the Sheppard-Towner money will be of value. We shall receive $73,869.99 from the federal fund.

This will enable us to enlarge our nursing force. We have eighty state-controlled health centers, and forty centers in which the state is cooperating with some other agency. Others are under private or community control. All told, we have between 375 and 400 well baby centers. The extra money will mean more nurses and more supervision for health centers. It gives us also an opportunity to undertake prenatal work. The establishment of prenatal centers has progressed very slowly. It does not take much money to start such work. The expectant mother has four rights. If we can serve her by educating her as to those rights, we ought to do so: 1. She should have regularly repeated urinalyses. 2. She should have a complete physical examination early, including pelvic measurements. 3. She should have her blood pressure taken at regular intervals. 4. She should have a Wassermann test made, not once, but more than once to ascertain the presence of syphilis. Our clinics are supplied with blood pressure instrument, facilities for making urinalysis, gloves, and a few other small pieces of apparatus. This the state sends to any prenatal clinic that is about to be opened. We hope to start twenty-four prenatal clinics in the state. I do not know whether we shall be able to do this, but we are going to make the effort. Again, regarding the control of midwives, the money has never been adequate; we have never been able to carry out any comprehensive plans. Now we propose to set aside from $10,000 to $15,000 of the Sheppard-Towner fund to demonstrate what can be done in the rural districts, as has been demonstrated in Philadelphia. One or more full-time nurses will be needed. A young woman who has received the proper training and who perceives the dramatic possibility of getting the midwives interested could do a really great work. I have seen it done where there was more difficulty than in this country or in Philadelphia. We demonstrated then that the midwife can become interested in doing better midwifery and in the use of safe, clean methods.

Dr. Taliaferro Clark, Washington, D. C.: The solution of the health problems relating to the mother and the infant constitutes the very foundation of all public health work. Beginning one generation ahead of disease, and concerned as it is with the causes rather than with the effects of bad health, child health work offers a most certain way of assuring a healthy adult generation. The Sheppard-Towner law is of too recent enactment for one to say with certainty what has been the direct effect of its provisions. However, in an indirect way the propaganda for the passage of this important and beneficent law has resulted in a more general interest in the problems of maternal and infant welfare. Furthermore, its passage has caused the health officers to take more careful stock of their resources and give more intensive consideration to this special form of health work,

in order that in carrying on the work under provisions of the law there may be no imbalance between these and the problems of general sanitation and public health. We should be gratified that Congress has been generous even to the limited extent of the present law. However, I do not feel that we should expect too much of its operation, because the funds provided are hardly sufficient to make any very great impress on these problems. The best we can do is to utilize these funds to the greatest advantage and make such showing during the time that the law is in operation as to create a more general public demand for ample funds to carry on this important form of health work in the future.

Dr. W. C. Woodward, Chicago: Massachusetts has refused to appropriate money for work under the Sheppard-Towner act, and the attorney-general of the state has reported that in his judgment the act is unconstitutional. Opposition to the act, it seems to me, is based on the fact that in its ultimate analysis the act represents a system of penalties imposed and the rewards granted by the federal government on and to the several states, according as the federal government may or may not be pleased with their conduct. First, the federal government demands of the people of the several states, in proportion to their respective taxable resources, an amount equal to what is required for the execution of the act. The federal government says to the several states: "If you conduct yourselves in a way that meets with the approval of certain of my officers, whom I have named, you may have back some of the money I have taken from you, after I have reserved some of it for my own administrative expenses—maybe all that remains—and, possibly, I may even add a bonus from money that I have taken from other states; but if you do not so conduct yourselves, you get nothing, not even the money I have taken. It matters not what your other needs may be—prevention of malaria, prevention of typhoid fever, the care of the mentally defective, the education of the rising generation—it matters not how much you are already spending for maternal and infant welfare and what your actual needs may be in respect to it—the money that I offer to return, and even the additional amount that you must appropriate in order to get it, must be spent for maternal and infant welfare and nothing else. Lest you judge unwisely—that is, differently from the way I would judge—as to your needs in this respect, you must have my paternal sanction of your plans and my approval of the way you carry them out, not only so far as relates to the work done with the money I have taken from you and returned, if you get any, but also as relates to the work done with the money that you have appropriated directly from your own treasury." It must be apparent to any one that if the federal government can lawfully pursue such a course with respect to maternal and infant welfare

within the several states, and with respect to other of their internal affairs which may in a general way affect the welfare of the nation, as every internal affair of every state does affect the welfare of the nation, the power of the states may soon be a thing of the past and our system of dual government near its end. And the principle of self-determination of small nations—and every state is in substance a small nation that has surrendered certain of its power to the federal government—for which we have contended so strongly abroad, will in our own country vanish. The fact that the federal government has followed such a course with respect to road making, agricultural education, vocational education and other matters, without objection, and has now proceeded to follow the same course with respect to maternal and infant welfare does not justify or excuse the step, but serves merely to indicate the gradual growth of a dangerous practice that may lead to the destruction of the very principles on which our government is founded.

Dr. C. Henry Davis, Milwaukee: I do not believe the points made by Dr. Woodward come into the discussion. The courts will decide the legality of the act. It is being discussed from the present health view. At present we must view it as we do the Volstead act. Whether we agree or not, we must accept it because it is here. The medical profession has had little to do with maternity except during a period of four or five centuries. In a twenty-year period ending in 1680, London statistics showed that one woman out of every forty-four died after childbirth. By a physician's being called early, this was reduced so that by 1840 one death occurred after every 168 births. Since 1840 the maternal death rate has remained stationary. As in all conditions in which we try to reduce the incidence of death, the earlier simple procedures will produce marked improvement. After reaching a certain point it is only by much greater expenditure of time and money that further improvement can be demonstrated. We feel that this should be considered a community proposition and worked out from that point of view by education of both the laity and the profession. Education of the profession means better instruction in obstetrics and the providing of better facilities for work. Until the physician demands better conditions under which to labor he will not secure them. The laity must learn that the present death rate is too high and that safety is possible to a much greater extent when there is proper cooperation between the laity and the medical profession. Increased safety always costs money, and the laity must spend more money if it is going to have greater safety in maternity.

Dr. S. W. Welch, Montgomery, Ala.: I come from that section of the United States which, about sixty years ago, started an uphill pull over state rights. My recollection is that Massachusetts was on the opposing side and, if I mis-

take not, won out in her contention. I have heard that the disagreement over this issue of state rights arose over the possession of certain properties, which the forefathers of my distinguished friend sold to my forefathers. The hard money of the South went to the East in payment for these purchases. When the award was rendered by the methods of arbitration mutually agreed on, no money came back to us for our property, and as a consequence the South has been very poor ever since. The conscience of Massachusetts did not appear to get tender on this issue until the business ceased to be profitable, nor does it appear to have become tender on federal subsidies, until Massachusetts had all she wanted. No protest seemed to have been entered against the high tariff, the deepening of water ways, the road subsidies nor the testing or treating of cattle. The rumor must be true that it is a hard climate on babies. Since babies are the chief asset of the poor, the South has them in large numbers. The climate suits them, and now, when we have a look in on a federal subsidy, let us have a share in it, while Massachusetts lays off, so that we may catch up with her. Alabama needs it. If the questions of constitutionality and state rights are to be raised, let them begin on live stock or some commercial question, and not on questions involving the lives of our children. The South needs the money to help furnish the nation with stronger men and women. If Massachusetts does not need it, very well; but let her keep her hands off of Alabama's share.

Dr. W. C. Woodward, Chicago: Perhaps Dr. Welch can name some instance in which Massachusetts has received the cream of federal aid. I know of no such instance, and without such knowledge I cannot intelligently discuss the suggestion that an undue share of some federal grant of money has at some time or other come to Massachusetts. If money to pay for the execution of the federal government's part of the cost of the Sheppard-Towner act be collected from the several states on the basis of their respective taxable resources and then be distributed among such states on the basis of population, the states in which the per capita taxable resources are high will financially be the losers. Danger exists in federal subsidies for special lines of activity, when the line selected is determined, as in the Sheppard-Towner act, on the basis of the supposed relative importance of that line of activity to the nation, as a whole, and not on the basis of its relative importance as compared with other internal needs of the particular state. I saw in print some time ago that, in one state, the legislature, lured by the bait of the federal subsidies dangling before it—bribed, some would have expressed it—made such appropriations for vocational and agricultural education that it was with difficulty that enough money could be obtained for the proper support of the general school system. So if a state be seduced into the

making of disproportionate appropriations for maternal and infant welfare, it may be unable to provide adequately for other needs—such as milk inspection, prevention of the spread of communicable diseases and medical inspection of schools —and the last state of the community may be worse than the first. Incidentally, attention may be called to an interesting situation that has arisen out of federal bonuses granted states for the purpose of stimulating them to appropriate money for the construction of good roads, which situation may possibly be duplicated under the Sheppard-Towner act. Federal bonuses stimulated road building in some places, it has been said, to such an extent that state money was not available for road maintenance, and the good roads constructed through the artificial stimulus of the federal bonuses were allowed to go into a state of decay. It is to be hoped that the mothers and babies whose health, it is claimed, will be built up and whose lives will be saved by the federal bonus provided by the Sheppard-Towner act will not be allowed to drag out enfeebled existences and to come to premature ends after the puerperium and the age of infancy have passed, because of the inability of the particular state in which they live to provide money necessary for proper sanitation, hygiene and health education, in the interest of the people as a whole.

Dr. D. B. McEachern, Chicago: I want to apologize for our profession in its efforts to refute the activities that this bill will make possible. I will not say all the profession. Apparently, according to the newspapers, it has taken an attitude that I would consider reactionary. There was opposition years ago to the establishment of the manual training departments in the public school. Every advance that is made is opposed. They have used every argument against the bill. Of course, the economic condition of the medical profession is endangered by a further extension of public health activities. Yet the medical profession must know that it has to get in line with the changing conditions. Failing to do so, it loses the representative position it should occupy in society.

Dr. A. N. Creadick, New Haven, Conn.: While there may have been opposition to the Sheppard-Towner act on the part of certain obstetricians, this feeling was based on the wording of the original bill. The operation of the present act should improve obstetric teaching and obstetric practice, largely by education of the people whether living in Massachusetts or Alabama, resulting in a demand for better care during the child-bearing period. A second and more serious objection to the bill is based on the risk of a large reduplication of agencies with an overlapping of their work. This will be obviated if the members of the board will utilize acceptable agencies already existing for accomplishing the purposes of the act.

Dr. Anna E. Rude, Washington, D. C.: Regarding the constitutionality of the act which Massachusetts seems to be questioning, I wish to state that there have been precedents for this type of legislation in this country since 1862. Massachusetts has also discovered that it is receiving funds from twenty-two federal agencies, so one is naturally interested to learn why the health protection of mothers and infants is so peculiarly paternalistic. All of us interested in the success of the measure know that, while the small appropriations carried in the act may limit its activities, at least a beginning toward better protection of motherhood and infancy is assured. There are now forty-two states ready to work as soon as the money is available. This means that in states which have heretofore not had a state child hygiene division, such a division will be established and work begun even if only through the medium of one public health nurse. The sincere effort and thought which have been put into state plans insure, I am confident, splendid progress in the field of maternity and infancy during the next five years; but unless the measure is educational and stimulating to the states, it will not be a success.

SOME NOTES ON THE EFFECTIVENESS OF THE VENEREAL DISEASE PROGRAM *

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MINNEAPOLIS

Four years ago it was my privilege to present a paper [1] before the Surgeon General's Conference in Washington outlining a state program against venereal diseases. This program was based very largely on work done in California, the first state to organize and finance a bureau of venereal diseases, and in Minnesota, where the work was organized some months later. This program included medical work, such as epidemiologic investigation of cases, organization of clinics, distribution of arsphenamin and the reporting of cases; laboratory work, such as Wassermann tests, examination of smears for gonococci, and dark field examinations for spirochetes; social service work, such as investigation of sources of infection, the rounding up of delinquent patients and in some cases stimulation of law enforcement against prostitution, and rehabilitation of delinquents; and educational work with both the laity and the medical profession in a variety of ways.

Within a comparatively short period nearly every state organized some work more or less along this line. Three years ago I [2] attempted to evaluate the

* From the Division of Venereal Diseases, Minnesota State Board of Health.

1. Irvine, H. G.: An Efficient State Program Against Venereal Diseases, Soc. Hyg. 4: 453 (Oct.) 1918.
2. Irvine, H. G.: The Venereal Disease Campaign in Retrospect, J. Cutan. Dis. 37: 748 (Nov.) 1919.

various items in this program, which until then had been very largely a war measure. Since that time the work has been devoted largely to the civilian population, and much has been written to cover the steps in the progress made. Most of this is familiar, and there seems no occasion to repeat it here; but most of us have now had sufficient experience, and enough time has elapsed to make it worth our while to take account of stock and discuss the effectiveness of that work. Taking account of stock is an excellent way to discover whether we have records of any value, and we must know something of the effectiveness of our methods if we are to continue spending public funds now, when economy is so necessary and yet seems so rare. It is hoped that this study may stimulate similar ones in other states, and provoke discussion which will lead to more effective measures.

One of the prime objects of our work has been the gathering of statistics which would give some indication of the morbidity of syphilis and gonorrhea. Practically every state has put in force a system of notification. In order that I might have recent data, a questionnaire was sent to every state; twenty-five replies [3] were received. In these states and Minnesota, there were reported, in 1920, 71,106 cases of syphilis and 97,823 cases of gonorrhea; in 1921, 65,644 cases of syphilis and 75,542 cases of gonorrhea. Including Minnesota, ten states showed increased reports of syphilis and seven showed increased reports of gonorrhea, while sixteen showed decrease of syphilis and nineteen decrease of gonorrhea. Of the total number of cases, six showed an increase and twenty a decrease. There is approximately an 8 per cent. decrease of syphilis and a 13 per cent. decrease of

3. The states replying were Alabama, Arkansas, California, Colorado, Connecticut, Delaware, Iowa, Kansas, Louisiana, Maine, Massachusetts, Michigan, Mississippi, Missouri, Nebraska, New Mexico, New York, New Jersey, North Carolina, North Dakota, Rhode Island, South Dakota, Washington, Wisconsin and Wyoming.

gonorrhea in all totals of each disease. While it is true that with all the work that has been done we might very well expect a decrease in morbidity, it is also a fact, I think, that reporting has at no time represented the true morbidity; and if reporting has become more effective, as it ought to with proper effort, then I believe that reporting ought to remain on a level at least, even if there were some real decrease in morbidity.

Many successful clinics continue to increase in size, and physicians known to be conscientious in reporting show no decrease; consequently, I doubt whether fewer people are being treated. Also, many officials in replying have stated frankly that they believe reporting has fallen off. Several states known to be doing effective work with many good clinics, good social service and with a mass of educational work behind them are among those showing increased reports; surely, if reporting indicated morbidity, these states ought to show a decrease.

The figures for the second million draft examinations are conceded to represent the best survey that has been made of the civilian population. Chart 1 shows the rate per 10,000 based on the percentage of venereal disease in the draft. It also shows the estimated rate per hundred thousand of population based on case reports for 1920-1921. If the rate for the draft was true for the rest of the population, then the line representing case reports should be ten times as high. However, many things must be taken into consideration. First, according to our studies as indicated in another chart, nearly 50 per cent. of all venereal infections occur during this draft age period; so the rate for the total population would be much less than this. On the other hand, except in a few instances, the diagnosis of syphilis and gonorrhea in draft examinations was made only in cases in which the disease was evident.

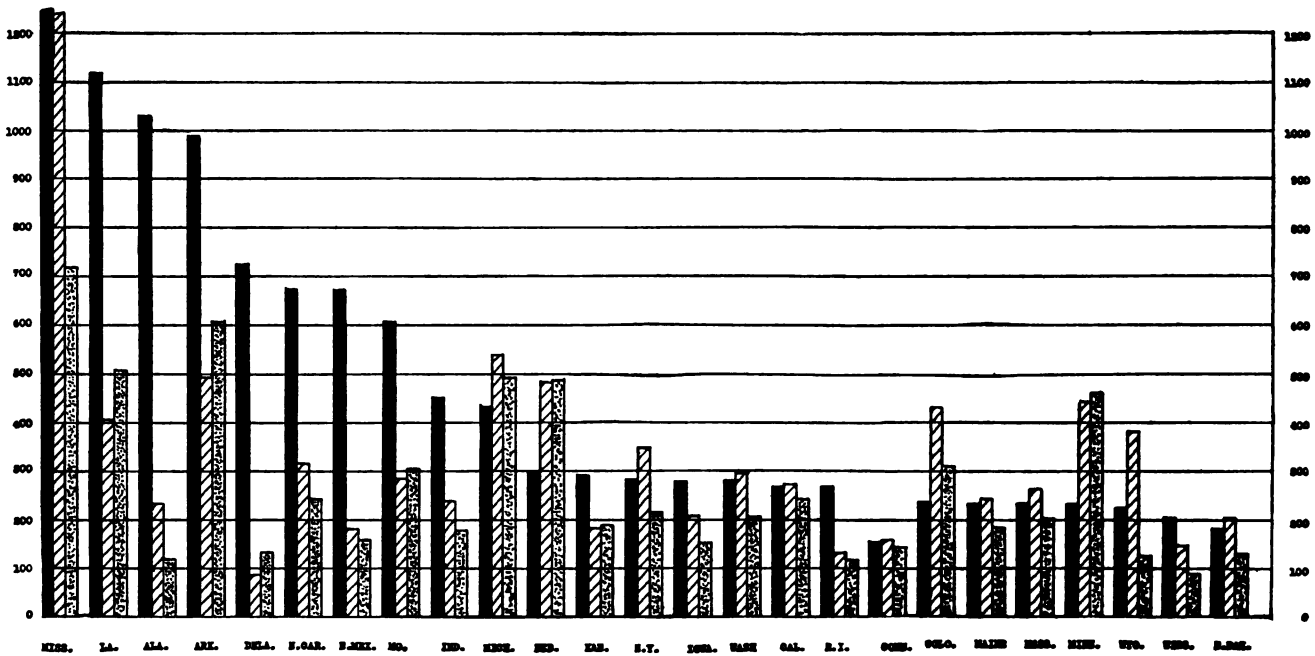

Chart 1.—Case reporting rates in various states, 1921 and 1922, compared with rate of venereal disease among men from these states as indicated by examinations of the second million called in the draft: solid columns, draft examination rate per 10,000; shaded columns, case reports per hundred thousand population in 1920; stippled columns, case reports per hundred thousand population in 1921.

Routine Wassermann tests would have added greatly to the percentage of syphilis, and careful expert examinations for chronic gonorrhea would also have increased that percentage. My own opinion, not based on actual figures, is that these factors would have made the rates for venereal disease at least three or four times greater. It may be said that during the last three or four years the work has decreased the rate as compared with draft figures. This might affect gonorrhea, but not so many cases of syphilis are cured in four years, although they might be if they were treated all that time. Taking all these factors into consideration, I believe that our reporting rate, as shown on the chart,

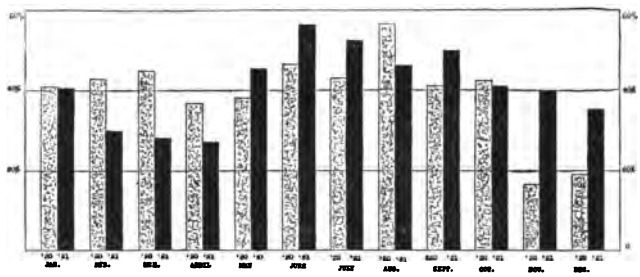

Chart 2.—Percentage of gonorrhea smears giving positive results, 1920, 1921.

ought to be represented by a line at least five times as high as that representing the draft rate if reporting represented morbidity.

In Minnesota the line for reporting is about twice the height of the draft rate, which is as good as that for any state we have had opportunity to study.

Some one has suggested that cases be reported by laboratory report, figuring that it might be possible to get all physicians to submit all specimens to the state laboratory and then check the positive findings. We have made a study of our positive laboratory findings, as indicated in Charts 2 and 3. It appears that the percentage of positives is rather constant for both syphilis and gonorrhea, syphilis running from 10 to 15

per cent. and gonorrhea from 30 to 40 per cent. However, the sum total of these positives is only about 50 per cent. of our case reports, as indicated in Table 1.

The question has been raised as to whether there was not a constant seasonal variation in venereal disease incidence; this ought to show in Minnesota if

TABLE 1.—NUMBER OF CASES REPORTED MONTH BY MONTH COMPARED WITH NUMBER OF POSITIVE FINDINGS IN LABORATORY SPECIMENS

	Syphilis		Gonorrhea	
1920	Cases Reported	Positive Wassermann	Cases Reported	Positive Smear
January	308	105	397	57
February	264	88	424	52
March	509	160	492	75
April	397	121	482	68
May	392	129	508	79
June	317	149	535	94
July	411	185	760	99
August	379	271	509	122
September	452	284	514	130
October	359	257	516	141
November	321	180	478	99
December	342	195	410	89
Total	4,451	2,069	6,020	1,100
1921				
January	590	268	663	82
February	486	327	426	101
March	586	270	550	98
April	408	161	439	104
May	285	179	372	152
June	314	175	587	222
July	291	208	525	183
August	414	241	667	239
September	308	214	545	219
October	402	228	502	215
November	375	281	563	207
December	361	301	488	182
Total	4,815	2,858	6,277	2,004
1922				
January	343	358	487	174
February	317	272	445	171
March	418	310	454	152

anywhere, for we have fairly hot summers and cold winters. A study has been made of this and the tabulations charted (Chart 4) showing reports for three years for comparison. There is possibly a little higher incidence in the warm months. In two years, 1919-1920, there was a marked increase in July; in 1919 and 1921 there was an increase in October, most

marked in 1919, and it is interesting to note that a study made at that time showed a considerable increase in reported sources of infection from commercial prostitutes. This was possibly occasioned by infections which took place in September incidental to our state fair, at which time many thousands come to the cities and there is usually an influx of prostitutes.

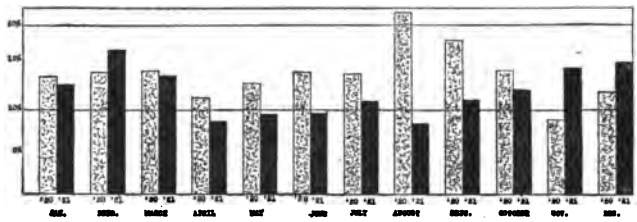

Chart 3.—Percentage of Wassermann tests giving positive results month by month, 1920 and 1921.

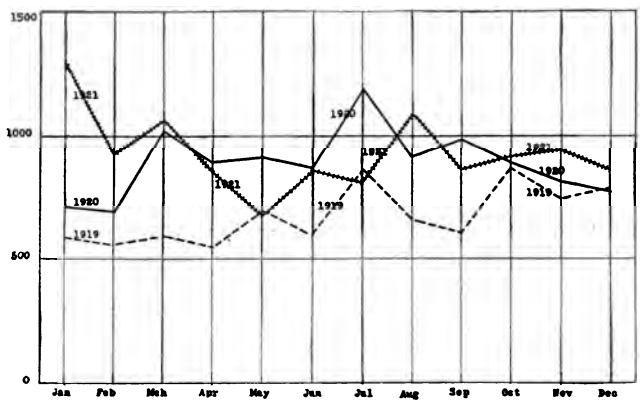

Chart 4.—Total cases reported month by month for 1919, 1920 and 1921.

A study made of the reports on each disease as well as the totals (Chart 5) indicates that usually there is an increase in each disease when there is an increase in the total. It is rare for a total increase to be caused by any marked increase of one or the other disease.

There are too many factors influencing reporting to permit the drawing of any definite conclusions.

Another question relative to reporting which has interested me very much has been that of reporting by name or by number. At the outset, many were opposed to reporting of any kind, and many are still opposed, with what I believe is good reason, to the reporting of all cases by name. Some states and a few cities require reports by name in every case. I have no data at hand

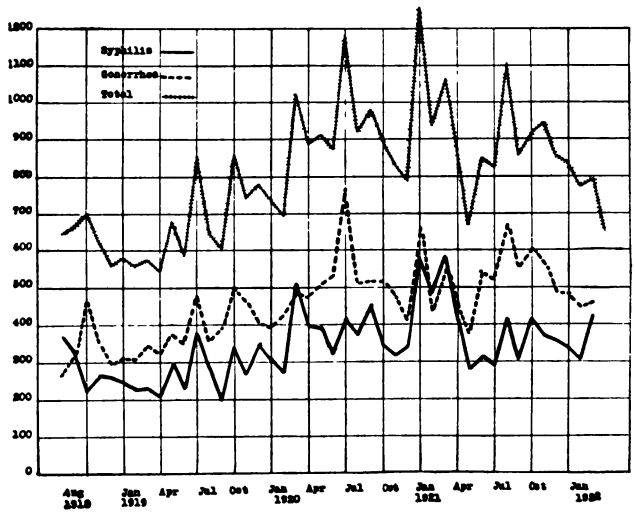

Chart 5.—Reports on each disease, as well as the totals: solid line, syphilis; broken line, gonorrhea; crossed line, totals.

to compare their reporting with localities not requiring the name. In Minnesota, reports of name and address are required only in delinquent or incorrigible patients, although the report may be by name. A study of our figures indicates a constant increase in reporting by name, and this is with no solicitation or request on our part. A study of Chart 6 shows a definite increase in reports from private practice in the two largest cities, and 85 per cent. of all reports from physicians outside these cities is by name. Sixty-nine per cent.

of all cases are reported by name. We feel that this is due to two reasons: (1) reporting direct to the state board instead of to the local board, and (2) the fact that our profession has confidence in the department. I do not believe that our reporting would be as good if required by name, and, furthermore, so long as we have names in those cases in which investigation is necessary, why require it in all and possibly antagonize

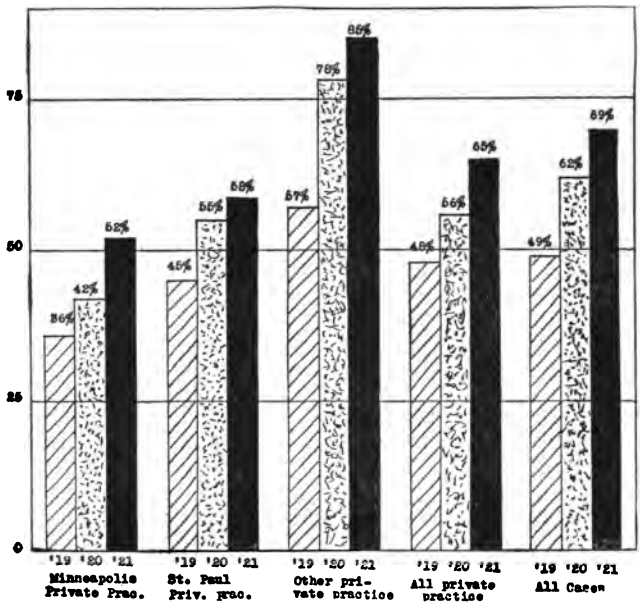

Chart 6.—Percentage of venereal disease cases reported by name, 1919, 1920 and 1921.

those on whom the success of the work largely depends?

A study of age groups develops some interesting data and also some food for thought. Three years' records show that the five year period 21-25 is consistently the highest, and that the group age 21-30 consistently includes nearly 50 per cent. of all cases (Table 2). The group from 16 to 20 shows some decrease during

the past year, and the group under 16 has doubled during the past year. Thinking that the last might be indicative of an increase in juvenile delinquency, we made a careful study of all these cases and found the increase almost entirely due to congenital syphilis. This means that more cases of congenital syphilis are being diagnosed either by the assistance of the laboratory or on account of the social service work in infected families. We have been repeatedly urged to emphasize sex hygiene and venereal disease education to girls and boys of school age, some even being in favor of work in the grade schools. If our greatest

TABLE 2.—AGE DISTRIBUTION BY FIVE YEAR GROUPS OF ALL CASES REPORTED FOR 1919, 1920, 1921

	No. of Cases Reported			Percentages		
	1919	1920	1921	1919	1920	1921
Under 16	300	350	706	3.1	3.5	6.8
From 16 to 20	1,280	1,509	1,297	13.2	15.4	12.5
21 to 25	2,531	2,646	2,835	26.2	27.0	27.5
26 to 30	1,823	1,968	2,110	19.0	19.7	20.5
31 to 35	1,170	1,267	1,185	12.1	12.9	11.5
36 to 40	858	818	863	8.9	8.4	8.4
41 to 45	435	497	529	4.5	5.0	5.3
46 to 50	328	327	290	3.4	3.4	2.8
Over 50	919	459	486	9.6	4.7	4.7
Toals	9,644	9,761	10,301			

incidence is from 21 to 30, would it not seem to indicate that we ought to concentrate a little more in that period? Chart 7 shows graphically the age distribution, both male and female, for a typical month, and Chart 8 shows the age distribution for male, female and total for each year from 14 to 33, in which period 75 per cent. of all the cases occur.

In an effort to study further juvenile delinquency we made some studies from our social service records to see whether we were having occasion to investigate and handle an increasing number of younger persons. It must of course be borne in mind that other organizations are more likely to be called on to handle these cases than is ours—this accounts to a degree for the

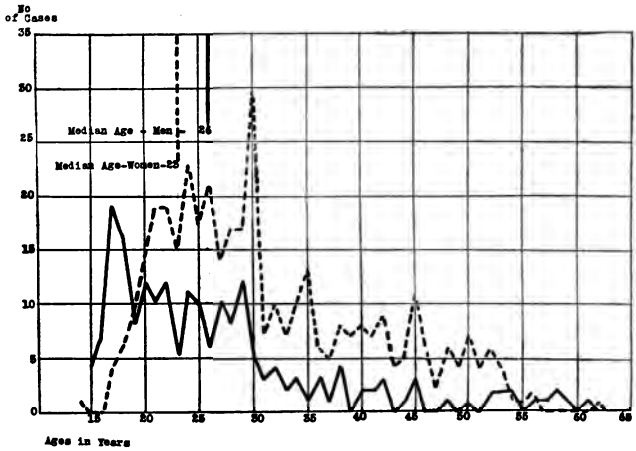

Chart 7.—Age distribution of cases of venereal disease for a typical month—March, 1922: solid line, male; broken line, female.

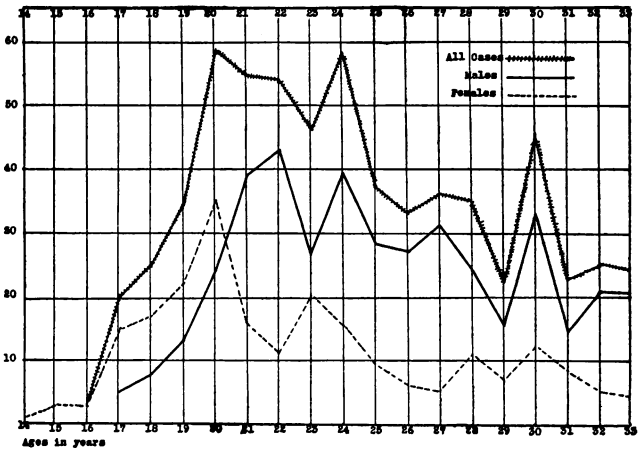

Chart 8.—Age incidence, cases reported in March, 1921.

small number below the 20 year mark. However, in comparing the work of March, 1921, with March, 1922, we find (Chart 9) that from 16 to 26 at almost every age we have had fewer cases, while from 26 on we have had an increased number. Chart 10 offers an opportunity to study both male and female cases for March, 1921, and March, 1922, at the various ages. Another study of a total of 2,553 social service cases for 1920, and 2,569 cases for 1921, was made to study their origin. It was found (Chart 11) that there was

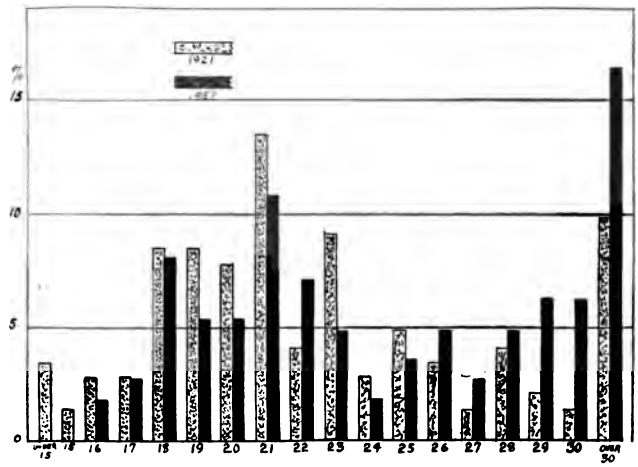

Chart 9.—Age grouping of social service cases, March, 1921, and March, 1922.

a decrease in the cases coming from physicians. This may mean, in view of the fact that he is reporting more cases of the diseases, that he has fewer delinquents. On the other hand, there has been a marked increase in the cases coming from hospitals and dispensaries; perhaps they are appreciating more and more the value of the state board of health because of its being an official agency with police power. Social agencies have reported only a little over half; this probably means that patients whom they formerly handled and would have to turn over to us are now already going

to hospitals or dispensaries, and if they get to us at all they come from the latter agencies.

The laboratory work in the venereal disease program is a most important one, and it is hoped that every state is making use of this opportunity to secure the coopera-

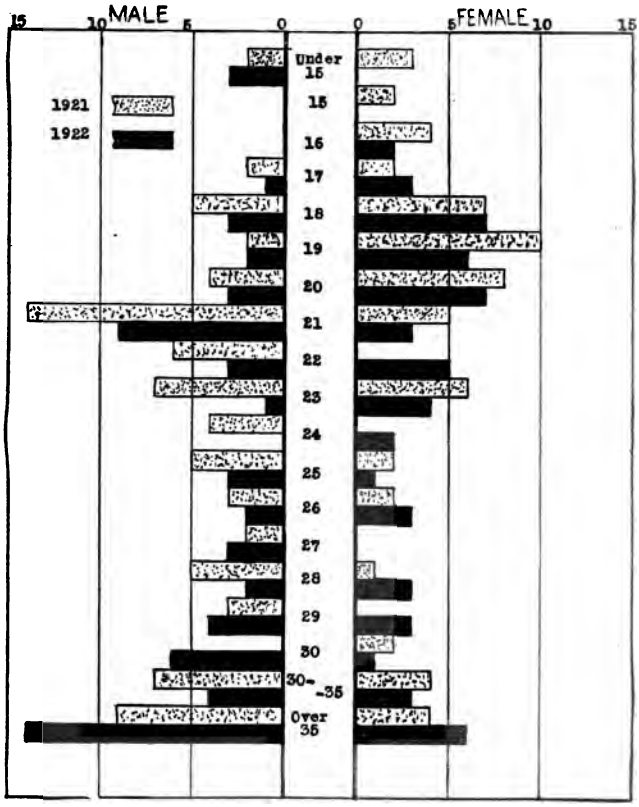

Chart 10.—Distribution of social service cases by age and by sex, comparing March, 1921, with March, 1922.

tion of the medical profession, as well as to render valuable service to the people. The work in our laboratory has grown during three years from nothing to more than 2,000 specimens a month. Some impression must be being made on physicians when in the month

of March this year they report about 1,000 cases but investigate more than 3,000, as indicated by laboratory specimens (Chart 12). Much harm may come from this laboratory work too; false positives may lead to false diagnoses; the reports of partial and incomplete positives make it possible for the unscrupulous physician to urge his patient to take treatment. Laboratory findings should be checked by physicians' clinical findings. Only complete positive or complete negative reports should be given out; all others should be

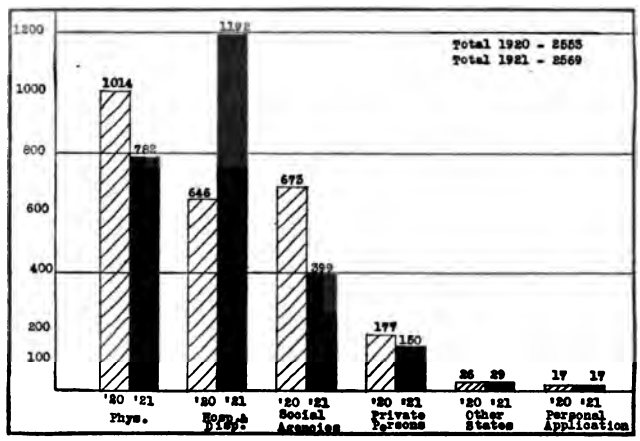

Chart 11.—Sources from which social service cases were referred.

reported as "doubtful" or "unsatisfactory," with a request for further specimens. We must recognize the difficulties of the Wassermann test and guard people against wrong interpretations.

Some studies should be made to get at the effectiveness of treatment in clinics; groups should be studied to see how long they attend and how much treatment they receive. Too many states have been satisfied merely to have clinics and have patients attend—the real test is the question of cure.

A careful study should be made as to where money is being spent, from the standpoint of being able to

show practical results to the people. Chart 13 shows the percentage of our budget expended for various items in the program during 1919, 1920, 1921 and 1922 (estimated). In spite of a large increase in many lines, our administration cost has increased very little. We have gradually decreased our educational expenditure because we felt that our state was pretty well covered the first year or two, and now it remains simply to keep the work going. In spite of increased numbers

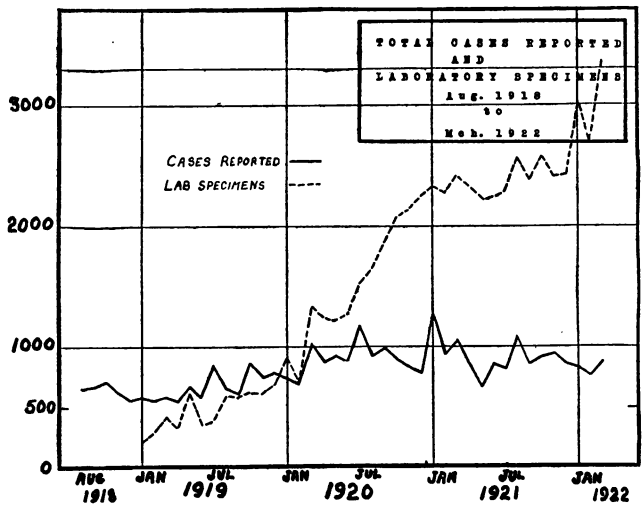

Chart 12.—Total cases reported and laboratory specimens, August, 1918, to March, 1922.

of treatments and of people being treated, our cost of this item has increased very little, and during the last year has been reduced by decentralizing clinics or putting them on a pay basis. Our social service has been an increasingly important factor, and we have accordingly increased our expenditures in this direction. Our laboratory work has tripled, and yet the cost has only doubled. I believe that money should be spent in increasing amounts on laboratory, social service and treatment facilities. I see little justification for

elaborate expensive educational campaigns, results of which are questionable and cannot be evaluated. I have little patience with state boards of health that have spent immense sums of money for quarantine and attempted rehabilitation of prostitutes. This work, as done from a medical standpoint, has little effect on venereal disease, and should be incidental to constructive work carried on by the courts and charged against other funds. No prostitute can be quarantined long enough to make her anything but a prostitute, and no

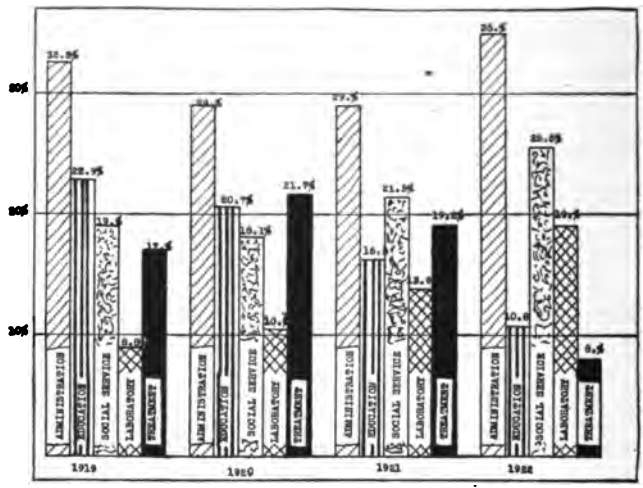

Chart 13.—Percentage of appropriation expended for various activities, fiscal years ending June 30, 1919, 1920, 1921 and 1922.

social service work without indeterminate or permanent detention can control her. Consequently, our work with prostitutes should be for educational purposes, to show the high percentage of disease; then let the courts handle this entire problem as a legal one, and the proper state body look to the reformation and control with incidental medical treatment. Under present conditions the courts sentence diseased prostitutes and find it convenient to turn others loose.

Every state with a properly organized and operated venereal disease department should be able to place before its legislature a tabulation such as that reproduced in Table 3, and show a dollars and cents return in practical service to the people which would leave no question as to the value of the investment. Treatments, laboratory tests and arsphenamin distributed and injected can be directly translated into money.

TABLE 3.—WORK OF DIVISION OF VENEREAL DISEASES, MINNESOTA STATE BOARD OF HEALTH

	1919	1920	1921
Cases Reported:			
Syphilis	3,326	4,451	4,815
Gonorrhea	4,622	6,020	6,277
Chancroid	197	228	202
Total	8,055	10,699	11,294
Laboratory:			
Wassermann tests	5,010	14,964	23,271
Smears	698	3,234	4,975
All examinations, including dark field	5,757	18,251	28,455
Subsidized Clinics:			
Patients admitted	2,087	1,639*	704
Treatments given	20,602	32,588	23,962
Arsphenamin:			
Doses distributed	5,082	8,177	5,094
Social Service:			
Cases handled	2,760	3,866	4,051
Number of towns in which cases were investigated	82	175	181
Educational:			
Number of pamphlets distributed	198,525	167,081	52,528
Number of exhibit days	62	439	232
Attendance at exhibits	65,088	73,498	36,720
Film shows	128	132	104
Attendance at film shows	47,040	41,412	20,120
Lectures	180	108	62
Attendance at lectures	38,500	3,200	3,330
Number of towns reached	.....	178	167

* Does not include persons carried over into this year, but admitted last year. In all, 2,261 persons were treated this year.

For the future, we need to solicit more and more the cooperation of the medical profession; we must have the reports of physicians, and they must be given in a spirit of cooperation. The people must get their treatments from physicians and we want them to get them right. We must not antagonize physicians by admitting private patients to clinics. We must improve our clinics by careful study of our records. Social service should be increased, but it should be sane and sensible, and it should go with the physician and not a mile

ahead of him. Educational work should be continued but possibly emphasized on older age groups than we have been trained to believe. Many states have been crippled somewhat by lack of federal appropriation. With its resumption, the best advantage should be taken of it.

Research work which has gone on with federal aid has justified itself, and it is hoped that it may be continued. Public health institutes have served a purpose, and can from experience be made more useful. One important thing in connection with them is the amount of time a number of recognized specialists have given; the assistance of these men has been invaluable, and it is to be hoped that every state will make use of any opportunity it has to secure aid from such men.

In conclusion, I wish to express my appreciation to Mr. Feezer of our department who made the tabulations and charts, and to Miss Sheridan, who made the lantern slides.

ABSTRACT OF DISCUSSION

Dr. Valeria Parker, Washington, D. C.: Dr. Irvine brought out quite clearly the importance of the source of infection with relation to venereal disease. Our department has developed a very definite method of procedure in dealing with the areas of infection. We found that in spite of a very careful physical examination and of education, in spite of good living conditions, in spite of prophylaxis, there were certain areas in which the existence of venereal disease is far beyond the average rate. Wherever this condition exists there are areas of open houses of prostitution easily accessible. We have, therefore, developed a system of sending to the houses confidential inspectors to find out where these sources are. During the war it was necessary to intern prostitutes and to institute isolation. Isolation was not a very successful method of dealing with the prostitute who was reinfected many times over. We then developed the system of dealing with the individual girl or woman from another point of view in an effort so to change her environment and possibly her inclination for promiscuous conduct as to prevent a reinfection. During this year, because of the cost of carrying on our program, instead of supplying workers capable of dealing with the individual prostitute, we have simply retained three expert workers who stimulate the communities to take part in this program, and provide their own workers with delinquent girls. The relationship between

the measures instituted for closing open houses of prostitution and dealing with the inmates after the closure is perhaps most clearly shown in Columbus, Ga., where early last summer the venereal rate was about 1.43 per thousand. Following closure of certain houses we secured a drop of 25 per cent. We have also interesting figures concerning the morbidity rate of venereal disease. Prior to the war the morbidity rate was about 90 per thousand. We have succeeded in reducing it to 62. In the U. S. Army the days lost from venereal disease were more numerous than from any other cause. The cash value of lost days through venereal disease exceeded $1,400,000 in 1920.

Dr. William F. Whyte, Madison, Wis.: There is one agency in Wisconsin which has done more to prevent venereal disease than any other, and that is prophylaxis. The natural point of prophylaxis is the Wisconsin eugenic law. Every man in Wisconsin who is going to be married has to get a statement that he is free from venereal disease. The second point is that education on that subject has done a great deal to do away with venereal disease. Every man and woman who is to be married knows perfectly well what will happen to a girl if she marries a man with gonorrhea or syphilis, and every man knows what is going to happen to his wife. Our health officers and medical men report a falling off in the cases of gonorrhea and syphilis they are treating all over the state of Wisconsin. There is a great increase in the number of persons with chronic cases reporting for treatment. They speak about breaking up houses of prostitution. One street in Milwaukee, River Street, on which there were a number of houses of prostitution, is now a street of hotels. A man in Milwaukee who rented his building for a house of ill fame got into trouble because the board of health had the district attorney get after him. There is a great falling off in venereal disease in Milwaukee. Two years ago one of our investigators studied the hygienic conditions in the militia camp at Camp Douglas. He examined 1,600 young men, all of draft age, and found four cases of gonorrhea. I do not believe one can find those results anywhere but in Wisconsin.

Dr. Carl Voegtlin, Washington, D. C.: I want to say a word on the relation of the method of administration of arsphenamin to control of syphilis. Arsphenamin was first given intramuscularly. The intravenous method was adopted because of the local reactions and pain which followed the intramuscular administration. I believe that a great step forward would be taken if the administration of the drug were simplified, and for that reason we have done some work during the last year at the Hygienic Laboratory in Washington to simplify the administration of arsphenamin. We have prepared a derivative of arsphenamin which can be given subcutaneously. It has proved very effective under experi-

mental conditions, and is now being tested clinically. I believe that this compound will make it possible to put a greater number of syphilitics under the controlling influence of arsenic. A good many physicians hesitate to give arsphenamin intravenously. I have no doubt that the subcutaneous administration of this compound is perfectly safe, and therefore could be used by any physician.

Dr. J. P. Bowdoin, Atlanta, Ga.: In Georgia, a state that had the second highest incidence of syphilis during the draft, there was a 4.5 per cent. reduction in brain syphilis in our asylums last year. Statistics show that physicians out in the country have been educated sufficiently to use arsphenamin in time to prevent brain syphilis. The question of education is perhaps the biggest question in the whole problem of the control of venereal disease. We have attempted to educate the physicians in Georgia as well as the laity. Each year we hold in our large cities an institute clinic for physicians. The institute clinic last year represented seventy-one counties of our state. The men spend a week studying nothing but venereal disease. Our physicians last year administered from our office 25,000 doses of arsphenamin. I have very little confidence in reports from physicians. They vary too much. The question of educating the physician to report cases has been one of the biggest problems we have had. The education of the people is beginning to show itself in ways we did not dream of when we began. A few years ago we would not have thought of mentioning this subject in the presence of women. Now we give lectures before women's clubs. The question in the South, of course, is a very serious problem because of the negro population. There is more infection in the negro race than in the white. They will not return for treatment. It is a still more serious problem as far as accidental infection is concerned, because we have a large percentage of accidental infections from nurses who are syphilitics.

Dr. J. F. Hogan, Baltimore: I do not think we have done anything in the control of gonorrhea, and it is difficult to do anything because at present it is difficult to say how long it is infectious. In the past year I think we have done something toward the control of syphilis. Beginning this year we started to have syphilis reported according to its stages, most of our reports of syphilis coming from the laboratories in the way of positive Wassermann reactions. The physician states the stage of the disease with which the patient is suffering or with which he suspects the patient is suffering. It was then decided that every three months we were to send out a questionnaire to physicians on these primary and secondary cases requesting them to inform us whether the patients were still cooperating with them in their treatment; that is, if the patient had taken enough arsphenamin and mercury to render him noninfectious. If the physician says that the

patient is cooperating, we do nothing further for three months and, if the physician says that the patient is not cooperating, we send a woman social investigator, working under the direction of the bureau of communicable diseases, to that individual to have him return to the physician or to the clinic for treatment. First she tells him he must return to the physician and, if he does not return to the physician or the clinic, the health officer is detailed to see him. A venereal disease clinic is absolutely of no value unless there is a proper follow-up system. Clinics should be rated primarily as to their follow-up system. I do not know that we can compel tertiary patients to continue treatment, but we can compel primary and secondary cases. The reporting by the so-called quack has been very good, while the reporting by prominent urologists and syphilolographers has been very poor.

Dr. Harry G. Irvine, Minneapolis: I have no great sympathy with state boards of health spending a lot of money for the control of the prostitute. Law enforcement per se is what has an effect on venereal disease. The closing of all houses is what should be done. Merely taking one or two girls and putting them away for two or three months' quarantine does not amount to anything. One cannot turn a prostitute into anything but a prostitute by quarantine. It takes a much longer time. From the standpoint of simplified treatment I want to sound a warning. I hope the United States Public Health Service will not be too anxious to put out simplified methods. There are a number of physicians just waiting for such a thing. There are very few men who cannot give arsphenamin. I dislike this shortcut medical treatment. We are just now beginning to have some idea of the value of arsphenamin. I have had fifteen or twenty years' experience in syphilis and particularly in the late stages; it takes a long time to learn the effects of treatment on syphilis. Expert methods are necessary for the diagnosis of gonorrhea; the laboratory is almost useless in gonorrhea in the male in the chronic stage.

HEALTH CENTERS OF THE MASSACHUSETTS-HALIFAX HEALTH COMMISSION

WITH SPECIAL REFERENCE TO PRESCHOOL-AGE DENTAL CLINICS AND NUTRITION CLASSES

B. FRANKLIN ROYER, M.D.
Executive Officer, Massachusetts-Halifax Health Commission
HALIFAX, N. S.

Health center work in Halifax and Dartmouth came about as a direct result of the ship disaster occurring in Halifax harbor, Dec. 6, 1917, when the *Mont Blanc* and the *Imo* collided. The *Mont Blanc* was loaded with trinitrotoluene, and a great explosion resulted, destroying the lives of 1,635 citizens, and wrecking several thousand dwelling houses. Practically all buildings in the two communities were severely damaged, the property loss alone amounting to $30,000,000. Immediately after the news reached Boston, citizens of Massachusetts hurried physicians and nurses to Halifax with relief and supplies. A very generous contribution of funds and supplies followed, the collection reaching almost $750,000. In addition, several shiploads and several trainloads of supplies and the personal assistance of many citizens of Massachusetts were contributed. As soon as the governments of Canada and England could visualize the disaster, and make plans to give permanent relief, a commission was formed to handle relief in an official way and pay for all loss of life, limb and property.

With the formation of the government organization, and its establishment on the ground, outside philanthropy was no longer needed. A quarter of a million dollars of the Massachusetts money remained unex-

pended at this time, and at the suggestion of the committee in Massachusetts, Dr. Victor G. Heiser studied local needs to determine how this large balance might be expended within the spirit of the donations, and for a need having some direct relation to the disaster. Dr. Heiser recommended that the money be employed in a campaign of public health education and preventive medicine, on condition that the government relief commission supplement it at the rate of $15,000 a year for a period of five years, and that the city of Halifax and the province of Nova Scotia each make contributions in facilities or money to the sum of $5,000 a year, the Massachusetts money to be apportioned as needed over approximately a five-year period. This was agreed to by all organizations, and a new commission, known as the Massachusetts-Halifax Health Commission, was created under a special act of the Nova Scotia legislature in May, 1919.

Dr. Heiser recommended the establishment of health centers as a part of the constructive educational health campaign. It has been my privilege to work out on the grounds the details of this supplemental health program in cooperation with the chief nurse of the commission, subject, of course, to the approval of the commission itself.

The child welfare clinics, the prenatal clinics, the ear, nose and throat services, the posture clinics, the venereal clinics and the tuberculosis services are organized very much along the lines now obtaining in the best health centers in other parts of the United States. Some medical advice is given and much public health counsel is offered both by physicians and by dentists, as well as by specially trained public health nurses and nutrition workers.

Some new features, however, have been introduced in the preschool-age dental clinics, and in the nutrition clinics, that are worthy of special discussion at this time.

In making preliminary plans for a preschool-age dental clinic, we first submitted our views to the Halifax Dental Society. The Dental Committee on Public Health of this society agreed to the suggestion that the proper place for, and the place most likely to give results in, preventive dentistry was in the preschool-age group, that is, up to 6 years. This committee agreed also with my suggestion that tooth nourishment should be featured out of all proportion to what has been done in health work in other places, and that prophylactic dentistry should be practiced in cooperation with such an instructional service. While the matter was under discussion, a subcommittee secured approval of the Canadian Dental Society, and a delegate secured approval of the American Dental Association.

It is the teaching plan of these health center preschool-age dental clinics to begin featuring tooth nourishment in the prenatal period. We try to make the expectant mother appreciate that unless she takes food from which sound bone and good teeth may be built, her baby will not grow a sound, strong, well-enameled set of temporary teeth, likely to remain sound and free from decay during the period of their natural use. We teach the mother to appreciate that the first set of teeth, even to the enamel, is pretty well finished when the child is born, although the teeth are under the gums in the jaw. We preach the use of liberal quantities of whole milk, the use of all leafy vegetables, even to raw cabbage, especially during the last six months of pregnancy. We aim to have the dentist in charge of this service advise with expectant mothers and the public health nurses, as well as the physician in this prenatal service and nursing period.

We begin dentistry with the baby at 6 months, whether bottle-fed or breast-fed, and try to control the health of the baby from then until he is 6 years of age, by taking him to the preschool-age dental clinic for guidance, and to impress on the mother essential food

lessons. The dentist in the clinic, and the public health nurse subsequently in the home, constantly keep before the mother the thought that, in this important period, the second teeth are being built and enameled. We urge that, unless the child is given through these years also the kind of food from which sound teeth may be built, the permanent teeth may decay at any time after complete eruption or in the early teens. We teach continuously and constantly that unless the right kind of food is taken—chiefly mother's milk the first year, and modified milk or good whole milk later and, as soon as possible, leafy vegetables, oatmeal porridge and whole wheat bread— one cannot lay the foundation for strong teeth or good lasting enamel. We emphasize in the clinic and through the health nurse and visiting housekeeper that tooth-feeding is of greater value than tooth-cleansing, but, at the same time, we teach oral hygiene.

The dentist teaches the use of the tooth brush in prophylactic work, and mechanically cleanses when necessary. With children coming to the clinic who have been improperly fed and whose mouths have been neglected, much repair work naturally is done, the sort dentists refer to as patchwork. Silver may be deposited by precipitation, both in shallow cavities that have been previously cleaned, and as a coating to teeth losing their enamel, with the hope of preserving them and keeping their value in the development of the jaw. Fillings may otherwise be put in. Sinuses and diseased gums are treated.

The whole of this dental clinic service, however, is educational rather than reparative. We teach that tooth-feeding must begin with the expectant mother and must be continued during the prenatal period. One of our slogans is: "A sanitary mouth with good oral habits at 6 is likely to remain a clean, healthy mouth at 60." We are fortunate in having a woman dentist, Dr. Arabelle Mackenzie, who has had a year

of postgraduate training in the Forsythe Clinic at Boston. She is tactful in handling children, and fits in well in coordinating her work with that of the medical staff. We have given her the title of pedodontist. She now has more than 300 babies and children less than 6 years of age coming to this clinic four times a year for dental advice. The nurse during the latter half of the first year visits the baby fortnightly, and once a month, or oftener if required, during the entire preschool period.

The school dentists of Halifax have already voluntarily made special report to the school authorities of the notable changes observed by them in children entering school during the last session, who have had from one year to eighteen months in the preschool dental clinic.

The nutrition services of the health center are organized much along the lines of Emerson's clinic in Boston, with some features of other clinics added. We have the additional advantage that the nurses', physicians' and consulting clinics, including the ear, nose, throat, posture and tuberculosis services, are operated from the same building. During summer months, adenoid and tonsil clinics are also conducted. In this way, we are able to do much as Dr. Wile does at the Mount Sinai clinic, viz., ask that handicaps be removed so that, as Dr. Emerson says, the child may be free to gain. Tonsils and adenoids must often be removed before a child may make great headway in a nutrition class.

We are fortunate in the nutrition service in having Dr. F. W. Tidmarsh in charge, a man with an excellent overseas record and a period of study in Emerson's clinic. The physician is supported by the public health nurses and visiting housekeepers (nutrition workers), who aim to correct any home environment that may be detrimental to health. When nutrition problems are paramount, the visiting housekeeper does the bulk of the home teaching, the nurse going occasionally. The

Fig. 1.—Dr. F. W. Tidmarsh's nutrition class in action. One class meets every Saturday afternoon in Health Center No. 1; another every Friday afternoon in Health Center No. 2. Emerson's class method with chart is used. Children showing greatest gain in front rows. Parents and grownups in the rear.

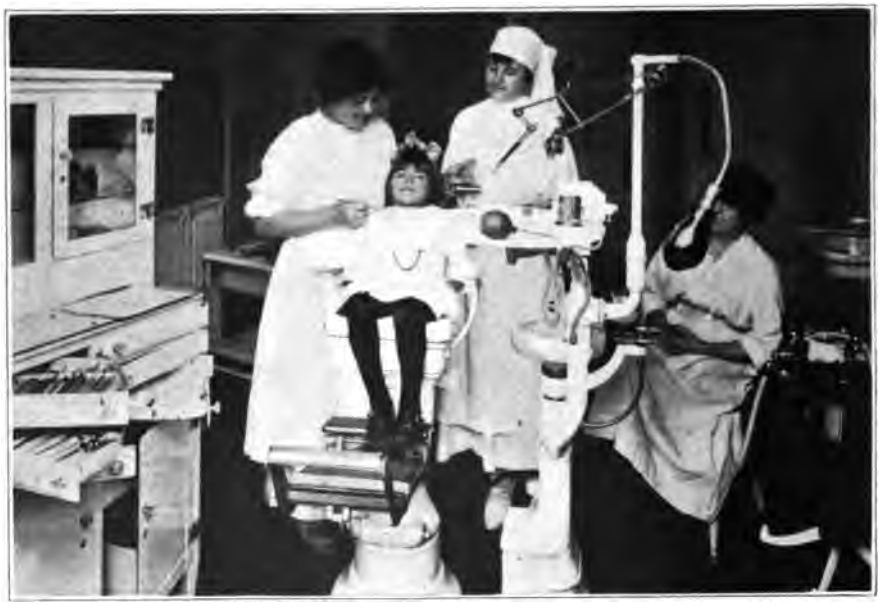

Fig. 2.—Dr. Arrabelle Mackenzie's preschool-age dental clinic. So far as known, this is the second strictly preschool-age dental clinic in the world, the first being organized in Cleveland, Ohio, while supplies were awaited in Halifax. No children admitted over 6 years of age. Prenatal feeding of teeth featured. The dentist in charge has the title of pedodontist.

visiting housekeeper is trained to go into the home and teach the housewife the kind of food the child needs in order that it may gain. Not only does she explain the kind of food that is needed, but she goes with the mother into the shop or market and teaches her how to buy economically the kind of food the family needs, and the kind the particularly undernourished child needs.

The aim in the health center is to develop only one class of the undernourished of school age, recruiting this class chiefly from homes with open tuberculosis. This class is used for feature purposes and educational publicity. We recognize that the largest and the most desirable places for nutrition classes must be, for some years at least, in the public schools. At present there are three such classes in the Halifax public schools.

Our larger aim is to give nutrition advice to undernourished children of the preschool age. In that period, children are not so commonly 7, 10 or 15 per cent. underweight, but there is quite as much need of nutrition advice alone, or combined with the advice of a pedodontist, as in the older groups. With these classes we aim to prevent gross malnutrition.

I have more fully described the larger health program in other articles.[1] It will suffice here to have elaborated somewhat on the special services of preschool-age dentistry, a service hardly started in health circles, and on nutrition classes running parallel with them, an innovation in health work until recently largely limited to the school-age period.

One fully organized health center is now operating in the northern part of Halifax with a summer substation for weighing and measuring babies. A second health center, suited to the needs of a population of 8,000, is operating in Dartmouth.

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1. Royer, B. F.; Am. J. Pub. Health **12**: 195-201 (March) 1922; M. J. Australia **1**: 451-456 (April 29) 1922.

The work of the first health center, when reviewed by representatives of the International Health Board of the Rockefeller Foundation, influenced them to "earmark" $200,000 for building a Dalhousie health center for the south end of Halifax. This new health center is being planned for the university as an integral teaching unit of the medical school, and will serve as an outpatient department to the group of hospitals now growing up in the immediate vicinity of the medical school. With health center service for the southern half of Halifax conducted by the medical faculty from a university building, with public health nurses on the staff, students of medicine will be given great clinical opportunities and will here for the first time be given ample opportunity to study domiciliary causes of diseases, and a chance to acquire a better fundamental groundwork for preventive medicine.

The general scheme of organization and the general plan of operation can perhaps be set forth best diagrammatically. It would be described about as follows: The commission consists of nine men, three of them being members by virtue of their offices: the provincial health officer, the chairman of the Halifax City Health Board and the health officer of the town of Dartmouth. Two are appointed by the Halifax Relief Commission and four by the Massachusetts-Halifax Relief Committee of Boston. The commission acts under a special provincial law, and meets semimonthly. Policies are determined by the commission, and work is directed through the executive officer and staff. The provincial and local health authorities are members of the commission for the purpose of coordinating the established work of each with the new work undertaken by the commission. It is the aim and object of the commission to do such lines of health work as should properly come under the local health officials in each community, and to work in the closest cooperation with all privately endowed philanthropic and charitable agencies, so that

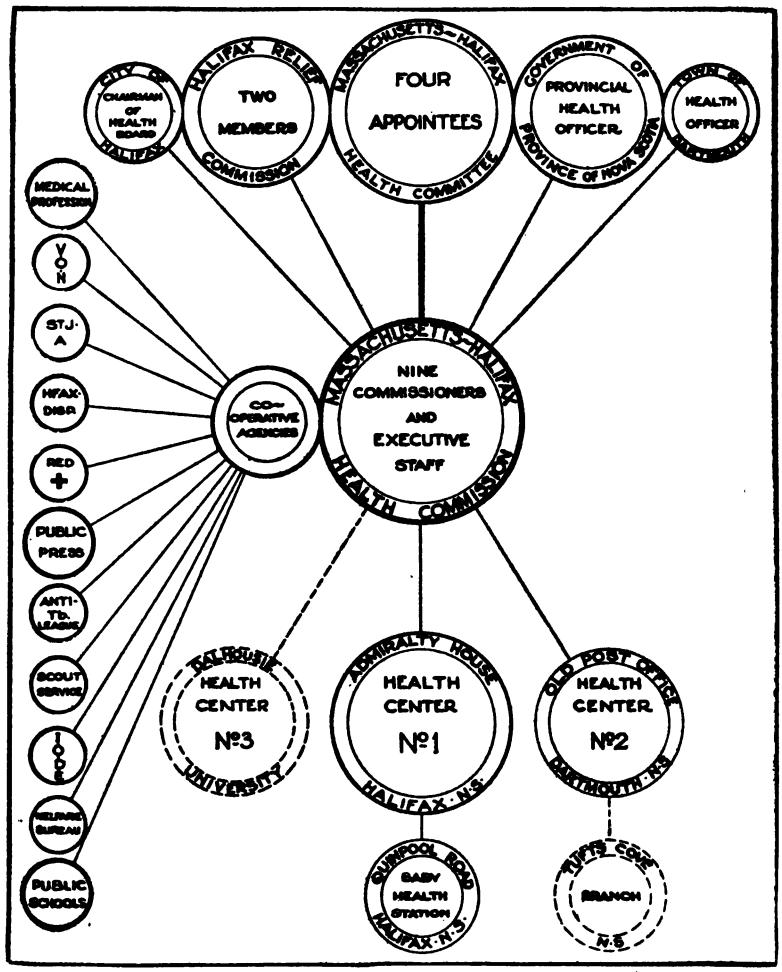

Fig. 3.—Massachusetts-Halifax Health Commission scheme of cooperation.

a minimum amount of overlapping will occur and waste will be avoided.

The public health nursing program is wholly constructive in character, and is a very large feature of the work. Each nurse is responsible for the entire public health program in the district assigned to her, and for the health of every member of each family with whom she comes in contact. She seeks to remove as far as possible domiciliary causes of diseases, and to train and reeducate the family in right methods of living. Bedside nursing is done in emergency only, or for family demonstrations. The Victorian Order of Nurses does the routine bedside work in homes of both communities, and gives general family instruction during such intervals.

ABSTRACT OF DISCUSSION

Dr. Isaac D. Rawlings, Springfield, Ill.: The establishment of the Massachusetts-Halifax Health Commission is somewhat unique in that it did not just happen but was the result of the mature deliberation of experts, and with all the facts furnished by a thorough survey of the needs and problems requiring solution to guide them. This commission is somewhat different from most health centers in that a definite plan is mapped out for a five-year period with experts in charge, no politics, adequate finances, a constructive program in all its features, with no duplication of efforts or conflict of authority, and with the entire personnel having but one goal, the lessening of the sick rate and the saving of lives. While the scope and standard of the Massachusetts-Halifax commission are, perhaps, the best yet established, there are many so-called "health centers" which are attempting some or all of the activities carried on by the Massachusetts-Halifax commission. In England such institutions have been quite common. The agency through which the health center operates may be public officials, it may be volunteer organizations, or it may be a combination of the two. The scope of the services performed varies with each health center. At the end of 1917, there were only about a dozen health centers in the United States. Three years later this number had increased to 385, and at present there are still more. Binghamton, N. Y., has established a health center which is producing excellent results. Altogether, eleven activities are brought into close contact, with the result that much lost motion and a great deal of overlapping of activi-

ties have been eliminated. In New Haven, Conn., a health center has been in operation for some time which deserves special mention. The center depends largely on private donations to carry on its work. The New York County chapter of the American Red Cross has affiliated all existing health agencies and opened health centers in various parts of New York City. A rather unique experiment in health center work has been established in New York City by the International Lady Garment Workers Union. This consists of a joint board of sanitary control, a medical division, a dental division and an educational division. Every worker joining the union is required to undergo a complete physical examination. When treatment is required, this is advised and administered. In 1909 the legislature of Illinois passed an "enabling act" permitting the people of any county by referendum to impose on themselves a tax for the care of the dependent tuberculous patients in the community. At present, more than forty counties of the 102 in the state have taken advantage of this act. The extension of this principle to include the prevention and treatment of all diseases, disabilities and injuries of a community has not been advanced in Illinois. In several other states, notably Iowa, each county has the right to establish a hospital for the care of residents of the county. The highest type of county organization has been reached in New York State, where the board of supervisors of the county was allowed to establish community or health centers. The board of supervisors provides the funds for these centers, and appoints a board of managers who supervise and control the health center. A hospital in such a health center may be constructed, the state paying half of its cost, with provision that the hospital shall not be greater than one bed to each 500 of population. In Illinois, a unique health center has been in existence for some time in La Salle, Peru and Oglesby. In 1914, at the township high school of these three cities, a social center was established for welfare and community work. Included was a hygienic institute to cooperate with the departments of health in the three cities. At the head of the hygienic institute was a health officer, under whom served, in each of the cities, an assistant health officer appointed by the mayor of the respective city. This gave the organization a legal standing. The scope of work consisted of enforcement of all local and state laws pertaining to the health of the people.

Dr. Anna Rude, Washington, D. C.: The two outstanding points for emphasis in this are, first, the small number of children considered as "malnourished" in the preschool period according to our present standards. These findings corroborate a report on the physical status of the preschool child which the Children's Bureau will soon publish, in which we have not drawn conclusions but have indicated that neither a 7 nor a 10 per cent. weight deviation from the

weight-height ratio is a standard applicable to the preschool age child. The second point is the importance of prophylactic dentistry during the preschool age. As one observes dental corrections in the schools throughout the country, one must be impressed with the futility of beginning dental repair work during the school age. Of fundamental importance is research in nutritional problems beginning with the mother during pregnancy and followed throughout infancy, and with prophylactic work in the preschool age, if we are going to make any improvement in dental defects in the children of this country.

COMMUNITY HEALTH FUNDAMENTALS AND HEALTH EDUCATION

JOHN DILL ROBERTSON, M.D.
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CHICAGO

A few years ago, garbage collection and street and alley sanitation and sewage disposal were considered the fundamentals of community health. Now, it is generally conceded that a very large percentage of all communicable diseases can be prevented by adequate pasteurization of milk, purification of the water supply, proper sewage disposal and isolation of disease carriers. Experience has shown that Dr. Chapin was correct when he stated years ago that only about 1 per cent. of a health department's effort should be expended on garbage removal and sanitation of streets and alleys.

Quarantining the disease carrier, disposal of sewage and more or less effectual efforts to secure a safe water supply are in effect in all cities and towns of any size; but two health fundamental procedures for the effectual safeguarding of the milk and water supplies, namely, pasteurization and chlorination, are less generally recognized (at least until quite recently) as valuable weapons in the fight against preventable disease. In Chicago, for example, there has been more or less of an attempt to isolate disease carriers since 1835; while pasteurization of milk as a health measure was first undertaken in 1903, and chlorination of water in 1912. The sewage problem in most American cities is still unsolved, for turning sewage into public waterways cannot be called a proper solution of this important problem.

Although there had been partial pasteurization of Chicago's milk supply since 1903, adequate pasteurization was not secured until 1916. A proper chlorination of the entire water supply was secured the same year. In the five-year period since 1916, there has not been a milk or water-borne epidemic in Chicago.

In order to appreciate the full significance of this fact, one need only look over the past history of our large cities. In 1891, the mortality rate for Chicago was 24.16 per thousand; last year, it was 11.08. In 1891, the city's death rate from scarlet fever was 43.4 per hundred thousand; last year, it was 6.4. In 1891, our death rate from typhoid fever was 173.8 per hundred thousand; last year, it was 1.1. The significance of these figures lies in the fact that, to find really startling death rates from milk and water-borne diseases, we are forced to go back to ancient history; and in view of their previous existence, the health officer is failing in his duty if he neglects the pasteurization of milk and the chlorination of water.

HEALTH PROMOTING AGENCIES

Many agencies have, of course, been responsible for Chicago's progress from the unhealthiest large city in the United States to one of the healthiest. Screening against flies and mosquitoes, campaigns against these pests, general education of the public, enforcement of quarantine regulations, etc.; all of these have undoubtedly contributed toward this result, just as they have contributed to lower the death rate all over the United States; but the marked decline of the death rate following so closely the more and more complete and efficient pasteurization of milk and chlorination of water leads to the conclusion that there must be some connection between the two.

When we use the term "pasteurization of milk," we, of course, mean the proper pasteurization of milk. There is no such thing as proper pasteurization of milk in any community unless there is a sufficient number

of honest inspectors to enforce it. Back of these inspectors must be a health officer and a chief executive, backed up by public opinion, to compel all milk dealers to pasteurize their milk continually or be forced out of business. In 1915, there were 1,400 milk dealers in the city of Chicago; at the present time, these have been reduced to less than 400, and every one of these 400 milk dealers knows that, in the event of his failure to pasteurize, his license to vend milk in the city will be canceled and that there is no political power sufficient to prevent its cancelation.

With this psychology at work among the milk distributors, they are unwilling to take any chances of losing their investment by the summary and permanent cancelation of their milk license. Eternal vigilance on the part of the health officer is the only guarantee that all of the milk of his community will be properly pasteurized.

CHLORINATION OF THE WATER SUPPLY

The water supply of Chicago is derived from Lake Michigan. It is taken in through seven intakes, located from 2 to 4 miles from shore. The lake at this distance is approximately 30 feet deep. There are ten pumping stations, and approximately 900,000,000 gallons of water is pumped daily.

The entire water supply of Chicago is now treated with liquid chlorin. The gas used is generated by the electrolysis of brine, compressed and cooled until it liquefies. Chlorin seems to have a specially deleterious effect on the colon and typhoid bacilli contained in water. Occasionally, objections have been raised on account of an alleged disagreeable taste or odor in treated waters; but the traces of chlorin are harmless, and when the objections are balanced against the prevention of disease and saving of lives, they become negligible.

Chicago first began to chlorinate its water at the Sixty-Eighth Street crib in March, 1912. The chlorin

was then administered in the form of calcium hypochlorite. It was found impracticable to continue this operation during cold weather, owing to the freezing of the solution in the tanks and pipes. Shut-downs were also caused by defective apparatus and there was difficulty in obtaining delivery of hypochlorite to the cribs. There was much complaint as to the taste of the water, and general dissatisfaction with this method from an operating standpoint.

Development of the newer method of treatment with liquid anhydrous chlorin soon reached a point which justified the abandonment of the earlier method, with all its difficulties of application. Accordingly, after some preliminary experimental work, machines for the administration of liquid chlorin were installed in all of the city pumping stations.

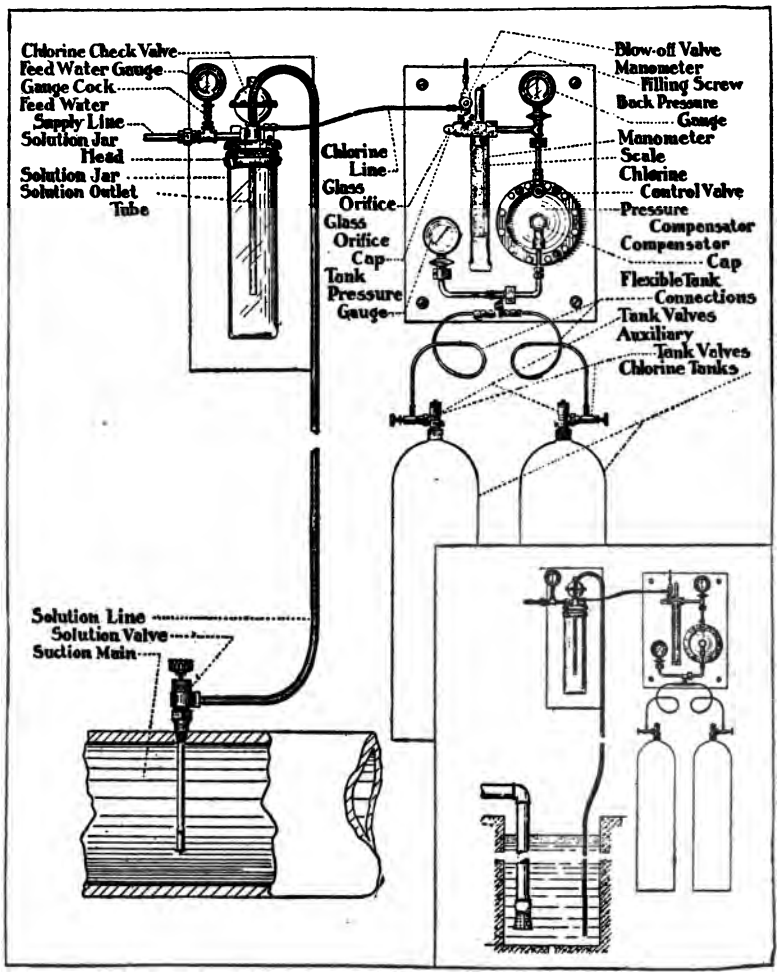
REDUCTION IN TYPHOID DEATHS

In Chicago, during the first nine months following the complete chlorination of the water supply, which was effected in the latter part of 1916, the death rate from typhoid fever was reduced by 71.44 per cent. Undoubtedly, the application of the chlorin treatment has contributed materially to the very gratifying reduction, which has placed the city of Chicago in the lead of all cities of its class in the United States during the past five years.

It can be demonstrated that many times the cost of chlorinating the water has been saved to the people of Chicago in the saving of lives and prevention of sickness.

APPLICATION OF LIQUID CHLORIN TREATMENT

The apparatus for the treatment of water with liquid chlorin is quite simple, although the dangers arising from accidents in handling it render extreme precautions necessary to insure the safety of those who come near. An illustration of the chlorinating device now in use by the city of Chicago is shown herewith.



Type M S B M *Type* M S B

Manual control, solution feed chlorinator.

The operation of the chlorin equipment is under the public works department. The chief operating engineer of the station delegates to his subordinates the actual duties of regulation, repairs and maintenance.

HUMAN ELEMENT A FACTOR

Thus, the human element in chlorination becomes a great factor. An instance of its frailty is shown by the following: In January, 1916, a heavy downpour of rain flooded the entire south side of Chicago, taxing the south side intercepting sewer beyond its capacity, so that the sewage from it backed into basements and overflowed into the wells at the Sixty-Eighth Street pumping station. This resulted in 113 cases of typhoid and eight deaths. At this very critical time, the caretaker stationed at the Sixty-Eighth Street crib, which is 2 miles out in the lake, beyond the reach of our health inspectors, had failed for a period of nine days to introduce into the city water any calcium hypochlorite, although assuring us over the telephone that the administration had not been stopped.

About this time, I appointed also Dr. Herman N. Bundesen, then epidemiologist, and Frank McDonough, engineer of the public works department, to solve the problem. This they have done. However, the human element is still there, and it is only by a rigid surveillance of this element by medical inspectors and by keeping the regulations of the dosage entirely in the hands of the health department, at all hours of the day and night, that we have been successful in maintaining proper dosage of chlorin at all times.

In an effort to determine what part these two health measures were playing in the general decline, a questionnaire was recently sent to the health departments of the twenty-five largest cities in the United States. Fifteen of these cities report complete chlorination of their water supply; three others report a partial chlorination of the supply.

Thirteen of them report 95 per cent. or more of their milk supply as either certified or pasteurized. Of the eight that permit the sale of five per cent. or more of raw milk, one reports a milk-borne epidemic present at the time and another fails to answer the question as to milk-borne epidemics. Only two cities of the twenty-one that answered report no means of safeguarding their milk supplies. One of these pasteurizes 50 per cent. of its supply; the other pasteurizes 60 per cent. in the winter and 95 per cent. in the summer. The former city reports a present milk-borne epidemic of septic sore throat. The latter reports no milk-borne epidemic during the last five years; however, the "law of distribution" worked out by statisticians shows that there are always from 5 to 15 per cent. of exceptions to any principle relating to living phenomena.

SOME SIGNIFICANT FIGURES

Statistics or data for a year or two do not furnish conclusive evidence; but statistics for a period of five years are significant. Take typhoid fever, for example. The death rate per hundred thousand in Chicago for the five years from 1917 to 1921, inclusive, was 1.6, 1.4, 1.2, 1.1 and 1.07, respectively, or an average of 1.3. For the five year period immediately preceding, the rate was 7.6, 10.6, 6.9, 5.3 and 5.1, or an average of 7.1. For the decades beginning with 1867, the figures run:

1867-1876	72.7 per hundred thousand
1877-1886	59.6 per hundred thousand
1887-1896	71.6 per hundred thousand
1897-1906	27.8 per hundred thousand
1906-1916	10.7 per hundred thousand
1917-1921 (½ decade)	1.3 per hundred thousand

The percentage decline in the typhoid death rate that followed the diversion of our sewage and the beginning of milk pasteurization was much less than the decline shown since there has been adequate milk

pasteurization and chlorination of the entire water supply, and corresponds to the decline in all large cities that have taken the same precautions.

A study of the figures for scarlet fever is equally interesting. For the decades from 1867 to the present are found the following figures:

1867-1876	80.0 per hundred thousand
1877-1886	63.5 per hundred thousand
1887-1896	21.1 per hundred thousand
1897-1906	14.2 per hundred thousand
1906-1916	19.6 per hundred thousand
1917-1921 (½ decade)	8.7 per hundred thousand

Only five of the twenty cities (heretofore referred to) for which data have been furnished had a typhoid death rate last year in excess of five per hundred thousand. All five permitted the sale of more or less raw milk.

In large cities in which there are five, six or seven deaths per hundred thousand, it frequently happens that the disease is contracted during a visit to rural districts where the milk and water supplies are not protected. For example, of 232 cases of typhoid fever in the city of Chicago last year, 48.27 per cent. of the patients contracted the disease outside of the limits of the city of Chicago, the majority of them while on vacation. When a city has reduced its typhoid rate to five or less per hundred thousand and is able to keep it there, it is safe to assume that they have a practically safe water and milk supply.

DANGER OF BOVINE INFECTION

It is certain that human beings can be infected with tuberculosis as a result of drinking milk from a tuberculous cow.

Last fall, Mr. Thomas E. Wilson, the packer, told me of a case of infection from a tuberculous cow in Edgar County, Illinois. A farmer, having had his herd of cows tuberculin tested, thought the test inaccurate when "Black Lady," a valuable cow in good

flesh and giving rich milk, reacted to the test. Later, when the farmer moved out of the county, he was unable to take the cow with him as she had been tagged and branded by the veterinarian, so he gave her to a farmhand who had seven small children. Five of the farmhand's children drank "Black Lady's" milk, and, in a few months, one of them had developed tuberculosis of the spine and the other four were suffering from glandular tuberculosis. The oldest child did not drink milk and the youngest, a baby, was breast-fed.

The case was reported to the local authorities by the attending physician; "Black Lady" was slaughtered, and the postmortem showed generalized tuberculosis. The farmhand's other animals—an old red cow, a pig and four cats—all had tuberculosis, and were likewise slaughtered. I sent Dr. Clara Jacobson, of our dispensary staff of the Municipal Tuberculosis Sanitarium, to check up on the report. She corroborated the statements in every essential detail.

The death rate from tuberculosis in Chicago has been reduced 65.5 per cent. per hundred thousand in the past five years. The death rate per hundred thousand by decades has been as follows:

1867-1876	246.2
1877-1886	198.5
1887-1896	196.4
1897-1906	178.6
1907-1916	172.2
1917-1921 (½ decade)	101.6
1921	83.6

There are not at present sufficient data on which to base an opinion as to just how large an influence pasteurization of milk has had in the decline in the tuberculosis death rate. However, practically all observers agree that pasteurization does prevent bone and glandular tuberculosis to a marked degree, and that through this process all bovine tuberculosis can be prevented. By properly safeguarding the milk and water supplies, determined milk-borne and water-borne

diseases have been almost entirely wiped out in all of our large cities; and it would seem that, this being accomplished, it then becomes the duty of the health officer to turn his attention to the education of the public in preventing the diseases resulting from poor personal hygiene.

HOME NURSES FOR THE SICK

The recent epidemic of influenza brought to our attention in a startling manner the fact that we do not have an adequate supply of trained women to nurse the sick. We think we have to a great degree found a solution of this problem in Chicago by training a great army of home nurses, which now consists of 9,927 women. This training school has been in existence for nearly three years. The course is eight weeks in duration. These women are known as home nurses. A very small percentage of them nurse outside of their own home, although there are 350 of their graduates that are at the present time doing nursing in homes for pay at a price half that received by the regular, trained graduate nurse.

In order to provide financial support for this school, a health and sanitation exposition was held at the Coliseum in November, 1920, in which a net profit of $92,000 was earned. The second health and sanitation exposition was held in conjunction with the Pageant of Progress in 1921 and netted $75,000 for the school. The school now has $140,000 in its treasury and is making ready to erect a building for the training of the people of our community not only in home nursing, but also in dental prophylaxis, the fitting and furnishing of glasses to those who are unable to pay, and for ear, nose and throat clinics.

FREE HOSPITAL ESTABLISHED

The home nurse's school has conducted for the past two years a free hospital, in which none but home nurses are serving. One of the home nurses is the

head nurse. More than 2,400 patients have been operated on, including all classes of operations, with a death rate of one-fourth of 1 per cent., which incidentally, is the lowest death rate of all hospitals in the city of Chicago.

The training these women receive makes them fine cooperators for public health work. In fact, a considerable part of their course deals with public health work. During the second epidemic of influenza in Chicago, 900 of these women volunteered their services, acting as visiting nurses to more than 12,000 patients.

This I believe to be an essential activity of a health department. Many things can be done with an army of women such as we have now created in the city of Chicago. They are useful in every health educational move that is made by the health department. They are helpful in spreading the doctrine of vaccination against smallpox, toxin-antitoxin as a preventive measure in diphtheria, etc.

These women are also helping to popularize the program for annual physical examinations, which, when carried out, will bring into active health work every physician in America not working for the city and the state or national governments, discovering the early stages of such degenerative diseases as those of the heart, kidney, liver and the blood vessels, and the early symptoms of neoplasm and tuberculosis. This field will fully occupy the time of all of our private practicing physicians.

SUMMARY

The health fundamentals of the health officer are to secure for his community pasteurized milk, a safe water supply, proper disposal of sewage, isolation of disease carriers, active immunization of people against smallpox, diphtheria, typhoid, etc., through the agency of a great health organization such as the Chicago Training School for Home and Public Health Nursing has proved to be in the city of Chicago.

This procedure will not only obtain results in the way of reduced death rates in his community, but also will give the health officer a backing which cannot and will not be influenced by politicians or others concerned with or affected by his vigorous enforcement of health laws; nor will it be likely to affect in an unfavorable way his tenure of office.

ABSTRACT OF DISCUSSION

Dr. Herman N. Bundesen, Chicago: You have heard the ideas of a man who has been health officer of the second largest city in the United States for seven years as to what the four big fundamentals are in health control; that is, pasteurization of milk, chlorination of water, isolation and control of disease carriers, and education. The results the country over are always the same. When you start to pasteurize the milk, there will be a certain definite drop in that community's morbidity and mortality. The same thing occurs with the proper protection of the water supply. Take a city the size of Chicago which does not dump its sewage into the lake but which has neighbors on the north and south who do: when we get the winds and currents in the direction of our cribs, we get the contamination. The effect of chlorination on a large body of water like Lake Michigan is remarkable. As soon as we obtained complete chlorination of Chicago's water supply, there was a decline in the typhoid rate of about 80 per cent. We have been criticized in Chicago for chlorinating the water, the people saying they would just as soon be aquariums as cemeteries, but this point we will not take up. The control of carriers is also the work of health officers. These three fundamentals can be controlled by any health officer who has energy and the laws behind him to do it.

The fourth big problem is one that is attracting the attention of scientific men all over the country, the matter of education. Unfortunately, pasteurization and chlorination will not prevent one of the diseases that Osler says causes more deaths than any other disease. I refer to syphilis. Dr. Rankin said yesterday that 20 per cent. of the insane asylums were occupied as a result of syphilis alone and that we were keeping pretty well apace with our syphilitics and our educated people; that these about balanced, as about as many syphilitics were in the insane asylums as we had students in the universities.

Dr. Allen J. Hruby, Chicago: The health authorities of Chicago have laid stress on pasteurization of milk, chlorination of water, isolation of the germ carrier and in extensive well organized and direct education of the public—the four defensive weapons against disease—and have seen to it that they are carried out in a most efficient manner. The isolation

of the germ carrier of tuberculosis has had considerable to do with the reduction in the death rate from tuberculosis in Chicago. The health department will not tolerate any open case of tuberculosis in contact with children, and forcibly hospitalizes, if necessary, such a patient, should be not be willing to be removed from his home; or, with the consent of the parents, the children are sent to the preventorium department at the Municipal Tuberculosis Sanitarium. Jan. 1, 1920, there were 215 known open cases of tuberculosis in contact with children, and April 1, 1922, there were thirty-four known open cases of tuberculosis in contact with children, which shows that there has been a very efficient drive against the carrier of *Bacillus tuberculosis.* Of course, another great factor was the bringing to light and placing under observation of patients with consumption by means of surveys, which practically doubled the number of patients under observation in the dispensaries of the Municipal Tuberculosis Sanitarium. The work connected with the survey and the isolation of the germ carrier rests on the efficiency of the field doctor and nurse. A great deal depends on their ability to diagnose the physical, social and environmental status of the case, and to handle the patient as field health officials. The physicians of Chicago are reporting their cases of tuberculosis more promptly than in the past, and for this the hearing board is greatly responsible. The function of this board is to call before it the physician who has failed to report a case and find out the reason why. Education, however, is the mighty weapon that the health officer has at his command to fight all disease. The methods of education used by most organizations are by pamphlet and poster. But the system of educational propaganda that has been instituted in our city at the Chicago School for Home and Public Health Nursing is, I believe, more profound and more efficient in reaching the desired goal. As most people are visualists, I believe the motion picture machine could be used to a greater extent in teaching.

Dr. A. E. Campbell, Springfield, Ill.: I am glad our large cities can show such a low death rate, but in my opinion there is a clear and simple explanation for this. Thousands of railroad employees who have temporary homes in Chicago die while at work on the road and are buried at the old home at the county seat. This is true as well of the thousands of traveling men who have temporary homes in Chicago. There is another reason. The young blood of the country rushes to the city. When some of them reach the age of 65 they are pensioned or discharged and their places filled with young men and women. They go home to die. I care not what your death rate is. Have you lengthened the span of life? Dr. Robertson believes that pasteurized milk has had much to do with this low death rate. I believe in pasteurized milk—but I also believe that a continuous high temperature with excessive humidity has more to do with the death of small

children than milk has and Dr. Chapin claims that less than 1 per cent. of the deaths in children are due to milk. We have three pasteurizing plants and fourteen dairies which sell raw milk. Three of these have tuberculous-free herds. I have more trouble with the former than with the latter. If the men who handle the milk beyond the pasteurizer are typhoid or diphtheria carriers, you are likely to have the pasteurized milk infected. The only safe milk is that pasteurized in the bottle. For the past five years, our highest death rate in small children was in the cold months of January, February and March and the cool months of September and October, due mostly to pneumonia caused by overheated rooms and improper clothing.

Dr. M. P. Ravenel, Columbia, Mo.: We can divide all health work into two parts. The average man does not think of this. There is the physical element which we can control and the human element which we cannot control. Dr. H. R. Carter, talking about malaria, says that he is on one side and Dr. Bass is on the other—he knows what he can do with the physical things but he does not know what he can do with the human element. When you come to deal with milk and water, those are physical conditions. I have always said that if health officers did nothing but supply pure water and pure milk they made good. Outside of that, the man who is going to make success is the man who is able to control the human element. That is the weak point in all our health work at the present time.

Dr. Isaac D. Rawlings, Springfield, Ill.: Dr. Campbell does not bring out the point that there are many more patients coming from Illinois towns to hospitals in Chicago and dying there than there are patients leaving Chicago to die in towns outside of Chicago. And all such deaths occurring in Chicago are counted in with the death rate of Chicago, even though the people did not reside there. There is absolutely no padding of figures either downstate or in Chicago. Regarding pasteurization of milk, in order to have a good grade of pasteurized milk, we must have a clean milk before it is pasteurized. If we can get adequate supervision of pasteurization plants and a reasonable degree of cleanliness, the conditions that were cited as occurring in Springfield cannot occur. The fact of an excessively high bacterial count in pasteurized milk shows something is wrong with the methods.

Dr. A. C. Tenny, Chicago: When the Hay commission was appointed in Chicago, we heard all about the vitamins being destroyed and the crippled children we would have if the milk should be pasteurized. Physicians in Chicago now recognize that the pasteurized milk coming to the children has not lost anything which cannot be readily supplied with a little orange juice and a little vegetable extract in the

form of soups, which replace all that pasteurization destroys. When you take this fact into consideration, you can see what a wonderful benefit pasteurization is in the prevention of the spread of contagious disease. It seems to me there can be no argument against pasteurization. The condition that exists in the dirty pasteurizing plant described by Dr. Campbell shows that the human element has to be appreciated. Many dairymen are careless in the protection of the milk because they feel that pasteurization is going to clean it of all impurities. This is a certain danger. The production of milk for pasteurization should be conducted with the same care as that which is exercised in producing certified milk. That would be ideal. A plant as dirty as the one described has not been inspected adequately. Pasteurization has come to stay. I can see no objection to its universal adoption throughout the United States.

Dr. J. D. Dowling, Birmingham, Ala.: The only safe position for a health officer to occupy with reference to the milk supply is that all market milk should be pasteurized. However, in some communities, there is still a tendency to permit the distribution of the higher grades of raw milk, especially certified milk, on the theory that provision should be made whereby those who prefer to use milk in its raw state should not be denied the privilege of exercising their option. Because of such reason, frequently coupled with considerations of political expediency, the health officer may feel bound to modify his requirements so as to admit a limited amount of raw milk, but in this event his ideals should not be altered, and in connection with his educational activities it should be freely and frankly stated that users of raw milk must necessarily assume a hazard against which a health organization cannot afford a reliable safeguard. In formulating regulations dealing with milk control, cleanliness and the factors necessary to assure a low bacterial count should be emphasized to a degree which, if complied with, will at least minimize the chances of harm, and which will, at the same time, tend to discourage the attempt to distribute milk in its raw state in any considerable volume.

Dr. John Dill Robertson, Chicago: The death rate of Springfield was 14.5 per thousand while Chicago's was 11.5 per thousand. Dr. Campbell is the health officer and he has very little help. In 1914, before milk was pasteurized in Chicago, the death rate in babies under 1 year of age was 135 per thousand. In 1921, the death rate was 84 per thousand. He is quite correct in saying that we have a higher death rate among children in the winter months. That is because the milk is taken into a warm room, where the temperature is that of summer time, and not kept sufficiently cool; consequently it causes more deaths. Dr. Ravenel is absolutely right. You can control the physical element but you cannot

control the human element. You can say that certified milk is safe under restriction, but once in a while, notwithstanding how much care is exercised, a streptococcic sore throat is traceable to certified milk. Once in a while you will have a typhoid fever carrier or a scarlet fever carrier among the workers in the certified dairy, and the milk becomes contaminated. In 1907, Chicago had the worst epidemic of scarlet fever it ever had, and it was traced to milk. A dealer who does not pasteurize his milk should not be permitted to sell it. I told the city of Springfield that they would have to pasteurize their milk. They did not have pasteurized milk because they did not have a sufficient number of inspectors to see that the milk was pasteurized. You must put energy into getting pasteurized milk. When they do that in Springfield, they will get exactly the same result we have in Chicago.

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